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Recommendations for
Development ...

Gov/Position PAPERS

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P O S I T I O N P A P E R S
PREPARED FOR AAMC SPONSORED REGIONAL CONFERENCES
as a part of the
MEDICAL COLLEGE ADMISSIONS ASSESSMENT PROGRAM STUDY

Association of American Medical Colleges
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August, 1973

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FOR DEVELOPMENT OF AN ADMISSIONS
ASSESSMENT PROGRAM FOR MEDICAL COLLEGES

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I N T R O D U C T I O N

The position papers included in this book represent the first formal input of AAMC related organizations to the Medical College Admissions Assessment Program (MCAAP). MCAAP is a national effort by AAMC to do a full review of the admissions process as it presently affects medical schools, premedical students and their advisors, administrators and faculty, and researchers. The objectives for this study include development of guidelines from which a program can be developed which will provide for improved handling of admissions by all parties concerned.

The papers presented here were developed by representatives of the following regional organizations:

Council of Deans: Midwest/Great Plains, Southern, Western
Group on Student Affairs: Central, Northeast, Southern, Western
Group on Medical Education: Central, Northeast, Southern, Western
Organization of Student Representatives: Central, Northeast, Southern, Western
Association of Advisors to the Health Professions: Central, Northeast, Southern
Western.

In addition to the regional papers, a paper was prepared by the Committee on Measurement of Personality, addressing issues related to noncognitive behavior and assessment.

Papers were prepared by representatives from each regional organization following the various regional meetings in late winter and spring, 1973. These were then presented and discussed by participants in four AAMC sponsored MCAAP Regional Conferences in June and July, 1973. Each conference involved the regional chairmen and representatives of the regional organizations, and included representatives from the Committee on Measurement of Personality, GSA Committee on Minority Affairs, selected AAMC staff, contractor representatives from American College Testing Program, and guests from organizations such as American Dental Association and American Academy of Family Physicians.

The position papers formed the bases for discussion at the conferences and the later preparation of a regional summary position paper for presentation to the MCAAP Task Force Meeting, scheduled for September 26-28, 1973 at the Washington Hilton.

Supplementary to the position papers are tabulated summaries of surveys completed by participants at several of the regional meetings. These summary reports are available from MCAAP. Regional summary papers, any additional position papers submitted and task force reports will be available upon request as they appear.

James L. Angel
Program Director
Medical College Admissions Assessment Program

August, 1973

M C A A P
CENTRAL REGION
POSITION PAPERS

Council of Deans

Group on Student Affairs

Group on Medical Education

Organization of Student Representatives

Association of Advisors to the Health
Professions



POSITION PAPER WITH RECOMMENDATIONS
FOR DEVELOPMENT OF AN ADMISSIONS
ASSESSMENT PROGRAM FOR MEDICAL COLLEGES

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Chicago, Illinois
June 28-29, 1973



Implicit in this report is that there is a high level of support for a more extensive admissions assessment program. The opinions of the individual member Deans on any substantive point are not known to the writer.

This paper makes the following assumptions:

1. Present admissions procedures select students into medicine who succeed (graduate) at a nearly optimal number and rate.

2. Present admissions procedures better predict those who will succeed in basic science study than in clinical studies.

3. Performance in medical school (as reported in standard grading procedures) is poorly correlated with later performance in medical practice.

4. The factor that loads heaviest in selection into medical school is the combination of academic achievement (as measured by grades in college) and high performance on the Medical College Admissions Test. Other factors that are considered in admissions account for a small number of "shifts" in the selection between the excess number of high academic achievers for the available places.

5. Undergraduate colleges and universities will increase the number of graduates who are more than intellectually prepared for medical studies with results that still larger numbers of "qualified" applicants, by present standards, will be available for selection and rejection.

6. Pre-admission assessment of additional variables will not of themselves increase or decrease the number of students who appear worthy of admission. There will likely be a shift towards an increasing number of applicants being able to present still

more laudatory characteristics and thus make it more difficult to "rank order" applicants.

Felt needs expressed by medical educators, practitioners and the public have included the need for already developed problem-solving skills upon entrance to medical school, persistent and careful "doers" with a high order of responsibility toward their patients and colleagues, ability to communicate with precision both verbally and in written fashion, willingness and ability to work with other health professionals and societal groups as well as with individuals patients.

I have been impressed on the one hand with the lack of assurance of Admissions Committee in either searching for or documenting these traits and abilities and in other instances anecdotal data from biographical information, recommendations and interview can give much assurance. However, there is usually neither a precise recording on admission about the above factors or a follow-up that permits one to test his precision or indeed the ultimate worth of these factors.

Overall there is probably more need for documenting the combination of intellectual skills and other variables that make for excellent practitioners than for any other single study so as to work backwards toward more precise identification of desired characteristics for admission. Failing the above evidence at this point; interim studies and measures can be justified.

Recommendations:

Long Term:

AAMC should find effective methods to work with other interested private and governmental parties to more definitively esta-

blish criteria for competent medical practice.

Shorter term:

1. Retain present type MCAT (minus general information).

Justification:

Along with college grades this allows one adequate assessment in most instances of many intellectual skills and achievement.

2. Develop and implement on experimental basis short tests of problem solving ability that test students ability in a field of thought that should be familiar to him. Sub-tests from fields of biology, chemistry and psychology could be useful assuming all projecting applicants would claim familiarity with one of these fields.

Justification:

Would identify some students, a bit below top levels on MCAT. If they were selected one could "track" this group to see if clinical performance as good or better than cohorts.

3. Administer a personality test in conjunction with MCAT.

Justification:

To better identify applicants with service orientation. To better identify applicants who might more predictably engage in areas of greater societal need.

4. Incorporate more specific biographical data into the AMCAS application.

Justification:

There is some evidence that this relates to attitudes towards self, toward others and towards modes of professional practice.

Comment and Conclusion:

It is problematic whether institution of the above measures

will result in any diminution of needed effort by Admission Committees, pre-professional advisors or applicants themselves. It is conjectural, but I believe institution of the above would increase the number of students who appear particularly promising for the medical profession. To compensate for this additional dilemma, each school would have more systematic recorded information upon admission, and could thus participate with AAMC in following these students to document whether discernible differences in medical school or practice performance did, in fact, take place. This should, in time, furnish desired feedback for further modification in the admissions assessment program.

If there is reluctance to institute the additional suggested assessment measures because of lack of evidence that, if used they would favorably influence future performance, they could be instituted on trial basis in select schools or with selected populations of resident physicians "ranked" by their chiefs and their colleagues. However, I urge institution of additional assessment measures without such preliminary trials because of some faith in their utility and the knowledge that at least half of our applicants possess the intellectual ability and achievement in science to "pass" in our present system were they admitted.

A POSITION PAPER PRESENTING RECOMMENDATIONS
FOR THE DEVELOPMENT OF AN ADMISSIONS ASSESS-
MENT PROGRAM FOR MEDICAL COLLEGES

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Chicago, Illinois
June 28-29, 1973



RECOMMENDATIONS

A. LEVEL OF SUPPORT

While no formal expression of support for a revised admissions assessment program was requested or discussed as such at the recent (May 10-12, 1973) meeting of the Central Regional Group on Student Affairs (Central GSA), the fact the the group devoted a full half day of its program to the proposed Medical College Admissions Assessment Program (MCAAP) is tacit evidence of its support. Furthermore, the enthusiasm with which its members entered into discussions of the several aspects of the proposed program suggests whole-hearted support on the part of the medical student affairs officers of the region. Additional evidence of this support is reflected in the fact that during its annual business meeting the Central GSA unanimously elected an official regional representative and directed its chairman to join the representative in participating in the MCAAP planning and program development conferences.

B. DEVELOPMENT OF MEASURES OF COGNITIVE BEHAVIOR

During the discussions it became evident that there was general agreement that the time had come to revise the MCAT. The basis of this concensus focused on the need for more and different kinds of information on the cognitive aspects of medical school applicants. In any new battery of examinations which might be developed for this purpose there should be measures of both general academic aptitude and achievement in the several undergraduate sciences and mathematics.

Superimposed on this interest in measures of aptitude and

achievement was a great deal of interest and a felt need to be able to obtain measures of communication ability, especially reading comprehension and reading rate. In addition, many medical student affairs officers believe there is a need for measure of something called "problem-solving ability." No doubt related to this concern were expressions of interest in measures of the ability of students "to distinguish the forest from the trees," and their ability to "recognize the problem."

(I believe it would be worthwhile at this point to remind the readers of this position paper of the rather long and somewhat bloody past history of other struggles to "revise" the MCAT. It is littered with the bones of efforts to develop new and better tests, all of which seemed promising at the time. As early as 1956 the AAMC's subcommittee on Evaluation and Measurement met to re-evaluate the Medical College Admission Test and to consider ways of increasing its effectiveness. From a discussion of intellectual qualities believed to be important in the successful development of a future physician by a panel of medical educators, the following emerged:

- (1) Flexibility of thinking - the ability to change or to re-evaluate an accepted hypothesis in the light of new evidence;
- (2) Balanced judgment - the ability to evaluate and to weigh the importance of quantitative and semi-quantitative factors in a complex in which the absolute or "true" value of these factors is unknown, and to arrive at reasonable hypotheses among the many possible hypotheses provided by the complex and factors;

- (3) Critical perception - the ability to evaluate the printed page or the spoken word in an impartial, non-gullible manner;
- (4) Educability - the capacity for continuous intellectual growth;
- (5) Selectivity - the ability to select from a mass of learned material those elements relevant to the problem at hand;
- (6) Synthesizing ability - the ability to perceive unity and relatedness among apparently discrete areas of knowledge; and
- (7) Cultural awareness - a broad interest in, and sensitivity to, the world of which the individual is a part.

From this listing of intellectual qualities, Educational Testing Service (ETS) developed some eleven experimental tests to be tried out on prospective medical students. These included: four science tests, five general culture tests, one reading comprehension test, and one quantitative reasoning test. ETS wrote, protested, and analyzed two each of these eleven different kinds of test materials. This provided the ETS staff with a substantial pool of questions from which tests of known statistical properties were constructed for study and analysis. These experimental tests were then administered to some five or six thousand students who took the MCAT in the Fall of 1958. It was anticipated that the analysis of these test results would provide the data needed by AAMC to decide upon the best possible structure for the 1960 and subsequent forms of the MCAT. So far as I can determine all of these efforts more or less went for

naught since no such new MCAT format was ever instituted.

Two of these new experimental tests were especially promising, but the results seem to post a serious warning to those who work in the field of test development. One of these was called "Directed Memory." In relation to some of the cognitive abilities the GSA members favored measuring, one aspect of "Directed Memory" was the ability to scan material for the purpose of locating those crucial and relevant parts which are necessary to answer a specific problem. The results from the experimental tests were inconclusive, and the effort was considered "a bust."

The other test was one called "Critical Reading." Its purpose was to measure a candidate's tendency, as opposed to his ability, to read the printed word in a critical and evaluative manner. When the initial analysis was completed, it was found that the results raised more questions than they answered. So far as I am aware, these problems were never satisfactorily resolved and the MCAT program still has no valid, reliable tests either of "directed memory" or of "critical reading."

I suspect that the moral in the foregoing is that no matter how creative and promising the ideas may be for new experimental tests designed to measure desirable cognitive variables defined by us as very real and very important assets for the prospective medical student to possess, whether they prove fruitful or not will depend largely on criterion variables and how well they work in actual practice.)

Another aspect of the measurement of cognitive variables with which we must be concerned are those related to assuring relatively equitable treatment to all applicants. This is a con-

sideration particularly relevant to minority groups and those from various cultural backgrounds.

Finally, the Central GSA members expressed a clear wish for measures of cognitive behavior which would encompass at least two other characteristics: (1) measures which would lead to relatively precise predictions of future clinical performance at least as students and better yet as physicians, and (2) measures which would reduce insofar as possible the homogeneity they believe exists among current medical students and which will allow for more heterogeneity among them without sacrificing quality.

C. RECOMMENDATIONS FOR NECESSARY MATERIALS TO BE DEVELOPED TO SUPPORT AN ADMISSIONS ASSESSMENT PROGRAM

A serious problem which plagued the MCAT program for far too many years was the lack of a manual of any kind at all. The MCAT program was instituted in the late 1940's and the first edition of a Handbook was not published until the early 1960's. The second, and only other, edition was published in 1967. The meaning of this long empty period is that for some ten to twelve years the users of the MCAT had to function with an absolute minimum of information about such basic factors as test reliability and validity, the length and make-up of the several subtests, the meaning of the various scores, the predictive and descriptive values of the test, and the various ways in which the test results might best be used to be of the greatest effectiveness to admissions committees.

It is, therefore, recommended that one of the very first tasks which should be accomplished in any new admissions assessment program should be the development of a manual. As a matter of fact I would recommend two publications: first, a technical

manual which would be meaningful and useful to psychometricians and others planning to do research with the test; and second, a handbook in which emphasis would be placed on how to make the most effective use of the test results. The latter handbook should be replete with information regarding the appropriate use of the test and should be illustrated with examples of the best practices for applying test scores at particular medical schools.

A third publication might be directed specifically toward the needs of the applicant students who probably deserve to have as much information about the test as will appropriately help them prepare for the examination and reduce their pretest anxieties.

At AAMC national and regional meetings of the GSA, GME, and AAHP it would seem worthwhile to plan a series of interpretive and illustrative seminars and workshops to give the members of these groups the kind of information that will be most useful to them. These probably should be repeated at various intervals to help keep current with the turnovers which occur among these groups.

D. RECOMMENDATIONS FOR NON-COGNITIVE ELEMENTS IN AN ASSESSMENT PROGRAM

The Central GSA began its consideration of non-cognitive variables in the assessment of applicants to medical schools with the presentation of a short paper by the writer. Following this presentation the members present along with members of the Central OSR and AAHP were divided into several discussion groups to consider both cognitive and non-cognitive elements of assessment. To capture the flavor of this approach there is included here a copy of the paper presented followed by reactions which

were forthcoming from the discussion groups relative to non-cognitive aspects of medical school applicants.

ON THE ASSESSMENT OF NON-COGNITIVE ASPECTS
OF MEDICAL SCHOOL APPLICANTS

BY

W. W. Morris, Ph.D.*

Some sixteen years ago the Association of American Medical Colleges published The Appraisal of Applicants to Medical Schools (1), a report of the first teaching institute focusing on the medical student. In his prefatory remarks, Dean George Packer Berry wrote: "To succeed at horse racing, one must have horses that not only can, but will, run fast." In a very real sense, as you all know only too well, this still describes the formidable task facing Admissions Committees in the nation's medical college these days. Admissions officers find themselves confronted with an almost unmanageably large number of "horses," and it is their task to decide which of these not only can, but will run. Indeed one might try to improve on George Packer Berry and say that having selected applicants who have demonstrated their capacity and willingness to run we now have the additional task of trying to decide which will probably be able to complete the race and come in closest to the finishing line.

We have already heard a discussion of the use of objective measures such as the Medical College Admission Test and college

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transcripts, but we know that measures of high achievement and potential do not tell the whole story.

As perplexing as it is to identify students of superior intellectual qualities, it is far more difficult to identify the non-cognitive characteristics which, in company with intellectual qualities, will help us select those students who possess such characteristics as willingness to work persistently, a drive to achieve, a strong motivation for a career in medicine, the emotional maturity and stability to withstand the anxieties encountered when confronted with emotionally disturbing situations, compassion for others, and the many other noncognitive factors which might assure an able student of success or reduce an otherwise promising student to an under-achiever, a dropout or a failure. These are questions which have challenged admissions officers for many years.

Many of these questions are still relevant, but most remain unanswered. It was hoped that inter-institutional research, basically longitudinal in nature, would help to answer some of these questions. Therefore, 28 medical schools were selected to participate in what is now known as the AAMC Longitudinal Study. In the Fall of 1956 each of these 28 schools administered a battery of intellectual and non-intellectual tests to their entering freshmen. Ultimately it was to become possible to make both cross-sectional and longitudinal analyses of relationships between measured characteristics of students and progress through four years of medical education and on into their careers. You will be pleased to know that all of these data are now on tape and that there is a plan for their systematic analysis. Hope

still remains, therefore, that some of our basic questions may soon be answered.

On other fronts some progress has been made despite the fact that we have not yet reached definitive answers. Several years ago the ad hoc Committee on Measurement of Personality (COMP) was organized under the able chairmanship of Dr. William Schofield of the University of Minnesota. After reviewing the scene and compiling and up-to-date annotated bibliography (2), COMP sponsored an invitational conference on Personality Measurement in Medical Education, June 17-18, 1971, at Des Plaines, Illinois. The proceedings of that conference (3) have been published and they make a valuable contribution to our literature on this subject.

It would not seem too much to expect that in the face of these efforts we would be ready to add very significantly to this new effort of the Group on Student Affairs and the AAMC staff to revise and improve the selection process through the Medical College Admissions Assessment Program (MCAAP). Closer we may be, ready we are not! It would seem fair to ask, then, why not?

In the time remaining at my disposal I would like to try to suggest why we have failed so far in this area. Then I would suggest an approach which seems to me to hold the promise of success without too much additional effort.

In the years before the MCAT, the most commonly used selection test was the Moss Medical Aptitude Test. I would point out to you that both of these instruments were devised specifically to do a particular job: to assess the intellectual characteristics of applicants to medical school. Each was standardized on

medical school applicant populations.

One might point also to similar developments in the cases of the Dental Aptitude Test, the Nursing Aptitude Test, and the Law School Aptitude Test -- each quite properly designed for and standardized on the particular segment of the population concerned. Furthermore, so far as I know, each has been relatively successful in doing what it was designed to do -- that is, to assess the intellectual and other skill characteristics applicants possess.

I do not know the histories of the other tests, but I do know that medical faculties and admissions officers have had input to the MCAT, and in recent years through the MCAT Advisory Committee there was direct input from the GSA. I believe the record shows that this input has resulted in the strengthening and general improvement of the test and how it is used.

Now how have we gone about the business of trying to assess non-cognitive variables in our applicants? In quite a different way, and with quite different results. Mainly what has been done over the years has been to try to adapt already existing personality tests and methods to purposes for which they were never intended. (Note: we did not do this in the case of the assessment of intellectual variables, although there were many tests available at the time which might have been used in this way.) In the non-cognitive domain perhaps one of the most striking examples of what I am talking about is the Minnesota Multiphasic Personality Inventory which was originally designed to be of assistance in the diagnosis of psychiatric patients. I am not speaking disparagingly here of the MMPI, far from it, the people at Minnesota find it very useful! I simply want to illustrate how a method

devised for one set of purposes is being used for quite a different set of purposes. Again, the Allport-Vernon-Lindzey Study of Values, one of the finest instruments of its kind in assessing value systems; the Edwards Personal Preference Schedule, an outstanding instrument for the assessment of "normal" personality characteristics; and others too numerous to mention have been employed. But they were neither devised for nor standardized on medical school applicants.

I would propose, therefore, that, using the best features of existing inventories, we develop an instrument or instruments designed as precisely as possible to accomplish the purposes we have in mind and then standardize it or them on medical school applicant populations. With modern computer technology this should be a relatively straightforward task to perform. Let me illustrate one possible approach which I am about to launch at the University of Iowa College of Medicine.

Since applicants to medical school are in the position of desperately wanting to be selected, whatever instrument is to be used, in addition to possessing reliability and validity, must reduce "fakability" to a minimum. Of the methods now on the market, only the Edwards Personal Preference Schedule (EPPS), has such a built-in safeguard (4,5). This is what is known technically as the "forced-choice" technique which presumes that subjects will ordinarily try to present themselves in the best, or most sociably desirable light. This tendency is minimized in the EPPS by requiring the subject to choose between two paired statements drawn from different personality factors and matched for social desirability. The theory is that since the subject cannot

choose his preferred statement on the basis of social desirability, the choice that is made will tend to reveal his "true" preference and, therefore, his personality makeup. This is a fairly straightforward technique applicable to our situation.

I am, therefore, going to our faculty to learn which non-cognitive characteristics are regarded by them as most desirable in the student-physician. It should be noted here that some valuable work in another area of research has been done by Philip Price (6) in Utah and is applicable to this approach. Having determined what it is our faculties prize most highly, it should be a routine development problem to devise a forced-choice inventory which would permit us to get valuable and reliable insights into some of the non-cognitive attributes of our applicants. If this proves successful I should think it could then be expanded into a cooperative venture among selected schools.

I would be happy to work with any of you who are interested in such a cooperative approach to the refinement and standardization of such an instrument. Hopefully this kind of effort would find developmental support. Eventually then, along with the kind of biographical approaches being studied by Betty Mawardi at Case-Western Reserve, by Phillip Price, and by Harold Haley at Toledo and more recently at Virginia; the Medical Student Typology research of Graham and Otis at New Mexico; and the data emanating from the AAMC longitudinal study; it is hoped the kind of student-physician trait inventory we are working on will make a useful contribution to the non-cognitive portion of the MCAAP.

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In assessing non-cognitive aspects of our applicants the group repeatedly stressed the importance of the criterion groups used to establish the criteria to be assessed. Thus, it was believed, criterion information should be obtained from medical students, private practitioners, other health professionals, and patients in addition to medical school faculties.

The following is a list of the non-cognitive elements which emerged from the small group discussions:

- empathy
- emotional stability
- psycho-sexual maturity
- integrity and basic honesty
- curiosity and inquisitiveness
- compassion
- ability to manage other professionals in the health care team
- motivational goals
- ability to communicate effectively
- staying power
- ability to handle crises
- ability to relate to others and to understand

Finally, the Central Regional GSA members repeatedly stressed the need for greater heterogeneity of non-cognitive elements, just as they had also expressed the need for more heterogeneity of cognitive variables.

E. CONCLUDING STATEMENT

By their actions the Central GSA gave evidence of its enthusiastic support for a new medical college admissions assessment program.

There was great interest in and a felt need expressed for in-depth revisions of current modes of measuring cognitive variables. At the least a new battery of cognitive tests should include measures of aptitude and achievement; it should get at the more reasoning aspects of reading and problem-solving abilities; and hopefully be predictive of future clinical performance.

There was also keen interest expressed in the development of novel, or the adaptation of existing instruments to assess some or all of the non-cognitive variables of our medical school applicants. It was generally agreed that this would be the most difficult portion of the program to achieve.

In both areas of assessment there was a general plea for a less stereotyped kind of student.

Finally, it seemed apparent that as the assessment program becomes more sophisticated and involved, increased efforts to inform both students and faculties would become more and more necessary. A wide variety of media approaches, workshops and seminars was recommended.



A POSITION PAPER PRESENTING RECOMMENDATIONS
FOR THE DEVELOPMENT OF AN ADMISSIONS ASSESS-
MENT PROGRAM FOR MEDICAL COLLEGES

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Association of American Medical Colleges
Central Regional MCAAP Task Force Conference
Chicago, Illinois
June 28+29, 1973.



A. Level of Support for the Development of a Comprehensive Admissions Assessment Program

In May, 1973, at the Central regional meeting of the Group on Medical Education, 28 medical school representatives responded to an Opinion Survey on the MCAT revision. The results of the Survey are shown in Appendix A. The majority rank attached to each alternative is shown next to a, b, c, etc. If the majority was about evenly divided between two ranks, both ranks are shown. After ranking was completed, each alternative was separately rated on a 4-point scale from "Very Important" to "Very Unimportant". The letter circled shows the majority rating; if more than one letter is circled the majority was about equally divided between two ratings.

The results of the Opinion Survey may be summarized as follows:

1. College GSA (transcript information) and national examination scores of applicant abilities should be seriously considered at admission.
2. An admission assessment program is expected to predict first of all clinical performance.
3. Admission committees should collect achievement test data primarily in science and verbal skills.
4. Maturity and self-discipline are the two most desirable personality attributes in medical students.
5. Having more concern with non-intellective factors when selecting applicants and detecting students with realistic views of the demands and responsibilities of a medical career would have the greatest positive effect on

the quality of health care in this country.

6. Good admission work would be greatly assisted by providing self-assessment and counseling aids to students and in-service programs for faculty serving on admission committees.

Some representatives expressed concern over phasing out the MCAT without having it replaced by another national screening test that predicts achievement in medical school. In view of the fact that the MCAT predicts only achievement in the basic sciences but NOT in clinical medicine, and the majority wishes to use a measure that predicts clinical performance during and after medical school, the need for new national admission tests seems to be clear. It is also clear that most representatives feel that attention to non-intellective factors in the admission process would have a positive effect on the quality of health care.

B. Assessment of Cognitive Characteristics

Admission committees have relied primarily on two sources of data to assess cognitive abilities: premedical grade point average (GPA) and the MCAT. Numerous studies have shown that premedical GPA is related to GPA in the basic sciences. Validity studies with MCAT related MCAT scores to different kinds of criteria, such as attrition rate, academic rank and scores on the National Board. Of the four tests included in the MCAT, the Science achievement test tends to be the best predictor and it relates more closely to attrition rate and National Board Part I scores than to rank in medical school and National Board Part II scores.

The major difficulty in using the pre-medical GPA and the MCAT to screen applicants is the lack of relationship between basic science grades and performance as a physician. Wingard and Williamson (1973) reviewed all studies that attempted to relate grades to medical practice and found consistently very low or zero relationships. While it is true that nobody can become a physician who cannot cope with the basic sciences upon entering medical school, it is equally true that getting good grades in the first two years of medical school is no guarantee of becoming a competent physician. Hence, the issue is not simply to find better predictors than the premedical GPA and the MCAT, but to find relevant and specific criteria, other than course grades or scores on Part I of the National Boards, against which to validate any new measure that may be introduced. This is of crucial importance if medical schools want to produce competent practitioners.

While the ultimate long-range criteria, against which to validate admission tests is safe and competent medical practice, there is need for intermediate criteria to which admission measures may be related. It is recommended that admission committees in medical schools address themselves to the development of such criteria. For example, a composite clinical score that reflects different aspects of clinical problem solving ability may serve as criterion, based on ratings earned in different clerkships not only from supervision faculty but also from residents and interns who have occasion to observe students more closely than faculty. While ratings will always suffer from halo effect, generosity error, and limited interrater agreement, if many raters are involved, the reliability of ratings can be

sufficiently increased to be used as a meaningful criterion. Other criteria also need to be developed.

The following recommendations are made with reference to the assessment of cognitive characteristics needed for success in medicine:

1. The premedical GPA should be retained as a predictor because it has been consistently shown, in and outside of medical education, that a person's performance in past schooling predicts his performance in future schooling.
2. With the exception of the General Information Test, the MCAT should be administered until the predictive validity of the new tests are established.
3. With the increased admission of minority group students to medical schools, the range in abilities will be greater than had been in the past. For this reason the verbal and quantitative subtests of the MCAT may be more predictive of performance in the future than was the case with a very homogeneous group of applicants.
4. The science achievement subtest of the MCAT, which has had the best predictive validity for performance in the basic sciences should be retained until it is replaced by a science achievement test in the life sciences. Pre-medical advisors should be notified that knowledge of the life sciences is to be acquired in college to qualify for entrance to medical school.
5. A new test should be constructed that measures the ability to gather relevant information, analyze the meaning of each separate piece of information in relation to

the total problem and arrive at a conclusion on the basis of synthesis. This process is analogous to making a diagnosis which is of critical importance in medicine. While the subject matter of the test has to be one that is familiar to all entering students, which excludes medicine, it is believed that a problem-solving test with non-medical content ought to predict clinical problem-solving to some extent. This test could be administered experimentally in 10 to 15 medical schools for purposes of validation.

6. A test should be constructed that measures the ability to interpret data. Physicians are confronted with a great deal of information which is to be interpreted (X-rays, EKG's, laboratory results, etc.) and while the content of the test cannot be medical, students should be able to demonstrate the ability to read graphs, charts, and tables, and accurately interpret information contained in them. This test could be administered experimentally in 10 to 15 medical schools for purposes of validation.

C. Assessment of Non-Cognitive Characteristics

It is a well known fact that many more qualified students apply to medical school than may be admitted each year. While cognitive qualities are of primary importance in becoming a competent physician there is opportunity to choose among many whose cognitive qualifications are satisfactory. This choice should be guided by the assessment of affective qualifications.

While medical faculty agree that physicians ought to be

ethical, considerate of patients, cooperative with colleagues and paramedical personnel, to mention only a few requirements, they have taken the position that affective characteristics cannot be measured by tests. Consequently, they have chosen to form opinions about the applicant's affect primarily from pre-medical advisory reports, scant biographical data from application forms, and the admission interview. All of these are useful sources of information but they have not been used to best advantage. In most instances the information derived from these sources has been related to grades and, not surprisingly, no relationships were found. When related to career choices in medicine and conditions under which a person chooses to practice, the value of these data becomes evident. Hence the following recommendations include continuation of these methods for selection as well as the development of new methods to assess affect. Each of the following new methods could be administered experimentally in 10 to 15 medical schools for purposes of validation.

1. Information contained in the pre-medical advisory report and letters of recommendation should be coded and summarized to allow for relating these data to career choice and conditions of medical practice.
2. There is evidence to indicate that biographical data relates to different kinds of criteria (Price, 1971; Korman, 1968; Horowitz, 1964; Mawardi, 1971). It is suggested that application forms be revised to relate to different kinds of medical practice and attitudes toward learning.
3. The admission interview does not predict grades (Kelly,

1957; AAMC Conference Proceedings, 1971) and in one school correlated more with failure than success (Bloom, 1971). Interviews could be more useful predictors if interviewers were trained in what questions to ask. It is recommended that the AAMC provide training programs for admission interviewers to elicit information relevant, for example, to the type and locale of medical practice desired by the student, his commitment to spend some of his time providing free medical care for those unable to pay; his views regarding the use of paramedical personnel, etc.

4. A number of personality test scores, such as the California Psychological Inventory (Gough and Hall, 1964, Korman et. al., 1968); and the Myers-Briggs Type Indicator (1964) have been related to grades, career choice, clinical performance ratings and peer ratings and some of the results are encouraging. The most impressive evidence for a relationship between specialty choice and personality test scores is furnished by a longitudinal study with the Myers-Briggs Type Indicator (MBTI) that related medical students' scores on the MBTI to their specialties and to the locale of their practice 12 years after they received their M.D. degree.

It is recommended that the MBTI should be administered to entering students and more students should be selected with MBTI score patterns characteristic of general practitioners and physicians practicing in small towns. The items of this test are the least

- offensive among the available personality tests and the results are easy to communicate without using psychological terms, that are often met with resistance by both students and faculty.
5. Since medical practice requires tact and attention to the feelings of others, it is recommended that a test be constructed to measure affective sensitivity in interpersonal communications. Promising work has already been done in this area by Campbell, et. al., (1971); an extension of this approach to patient care situations, that do not require medical knowledge, is suggested.
 6. A new specialty, family practice, has been recently established, to emphasize comprehensive health care and to dignify general practice. Physicians in general are supposed to be aware not only of the physical, but also of the social-psychological-economic aspects of health care. It is recommended that a test be constructed that does not require medical knowledge but measures attention to the non-organic aspects of health care.
 7. Cattell (1949) has demonstrated that an information test may be used as an attitude test because people consistently over or underestimate facts according to their attitudes. An information test should be developed to measure attitudes toward such issues as national health insurance, pre-paid group practice, the role of physician's assistants, the role of the pediatric nurse practitioner, etc.

D. Support for a Revised Assessment Program

1. The most important support needed is the development of intermediate criteria to which new methods may be related. This involves the development of methods to quantify clinical performance. Pioneer work in this area has been done at Ohio State University and has also been reported in the literature (Cowles and Kubany, 1959). While each medical school could develop its own intermediate criteria, progress would be considerably faster if the AAMC would facilitate cooperation among medical schools. Regional workshops devoted to the development of intermediate criteria, acceptable to a group of medical schools, is one way to accomplish this goal.
2. The AAMC could support research to validate new tests against both intermediate and long-range criteria. Obtaining funds for validation studies has become increasingly difficult, while everybody agrees that longitudinal studies are needed to answer the question "Who should be admitted to medical school?"
3. Since most medical schools have to refuse qualified applicants because of lack of space, a national clearinghouse provided by the AAMC could redirect refused applicants either to another medical school or to another health profession, for example, a Ph.D. in life science, pharmacy, or dentistry.
4. The AAMC could distribute pertinent literature to premedical advisors to inform them not only of applicant characteristics sought by most medical schools,

but also of the institutional climate of different medical schools, since schools vary considerably in the learning environment that they provide. Astin's work (1963) in colleges shows clearly that the learning environment of each school can be objectively measured and is determined by the background of its students, the proportion of full and part time faculty and other objective data that is easily obtained.

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A POSITION PAPER PRESENTING RECOMMENDATIONS FOR
DEVELOPMENT OF AN ADMISSIONS ASSESSMENT PROGRAM
FOR MEDICAL COLLEGES

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Association of American Medical Colleges
Central Regional Conference
Chicago, Illinois
June 28-29, 1973



A. Level of Support for MCAAP

The central region membership of the Organization of Student Representatives enthusiastically favors revision of the present MCAT. However, we can not, at this point, support the MCAAP in its goal of developing a "comprehensive" admissions assessment program.

B. Recommendations for Development of Measures of Cognitive Behavior

1. Immediate recommendation

We recommend that during the interim period in which new cognitive tests are being explored and developed, the AAMC completely suspend the administration of the MCAT and request applicants to take the Graduate Record Examination (GRE) instead. Like the MCAT, the GRE includes tests of verbal and mathematical aptitude. Then, the examinee takes an achievement test in any area.

This "optional area" achievement test would thus replace the science test of the present MCAT. It has long been maintained by students that this science test is, at best, "irrelevant" to anything remotely connected with medical practice or with what they view as "applicant desirability." Unfortunately, most medical school deans have not seen a recent MCAT, but those who have tend to concur strongly in this opinion. The GRE area exam would measure a composite of the applicant's ability and motivation to achieve in his principal undergraduate field, which would serve the dual purposes of (1) being more individually fair and appropriate than a science achievement test that must be taken by all applicants and (2) facilitating our desire to attract more

applicants having other than the traditional science background; the present science achievement test places such applicants at a distinct disadvantage. However, an applicant's performance on such an area achievement test would necessarily have to be considered with regard to his college background.

The GRE has no equivalent of the MCAT General Information test, but this need not concern us, in light of the general agreement regarding the uselessness of this test.

2. Recommendations Appropriate to the Development of New Tests

(a) Aptitude vs. Achievement

We feel, most importantly, that, insofar as possible, the cognitive tests to be developed by the MCAAP should measure aptitude only, and not achievement. A high level of prior achievement is not necessary for one to get through medical school, and the basic information needed at the outset can be put into just a few pages. We recognize the importance of such subjects as psychology and sociology, and, indeed, have argued that these subjects be given more prominence in medical school curricula, yet we are completely baffled by suggestions that the MCAAP construct achievement tests in these fields. Would a high sociology score make an applicant more fit for medical school? Would it make him a potentially more competent clinician? Or, rather, would it simply indicate the number and type of sociology courses the student has had in college? Besides being irrelevant, such achievement tests would encourage pre-medical students to take a wide range of relatively superficial survey courses at the expense of sacrificing the opportunity for in-depth exploration of a given field (other than his major subject). We strongly

discourage the development and use of achievement tests.

(b) Priority Rankings of Academic Areas

Nevertheless, it is of interest to note our priority rankings of academic areas, as indicated by the MCAAP questionnaire.

"Science-survey" and "verbal skills" received the highest priorities, "behavioral and social sciences" and "general humanities" the lowest. Only the following specific areas were clearly considered important in admissions decisions:

- quantitative reasoning
- biology
- chemistry
- elementary general science principles
- interpretation of scientific experiments
- reading comprehension

Psychology, sociology, and arithmetic computation received borderline support. Our rating of physics as overwhelmingly unimportant is interesting.

(c) Breakdown of Science Test into Specific Areas

While we are opposed to achievement tests in general, we are doubly opposed to a science achievement test that would include a breakdown into individual areas. Admissions committees are presently overburdened and would welcome anything that would facilitate the rendering of their decisions and the justification of their decisions to angry parents, alumni, and law officials. With a printout in hand from MCAAP, giving an applicant's scores in all the various fields of science, no other information would be necessary, not even a college transcript - or so it might eventually seem to the admissions committee. A science test with broken-down scores would have a great potential for abuse, and

would thus be worse than irrelevant.

(d) Recommended Science Test

We would like the MCAAP to develop a science test that would deal with the following abilities:

problem solving

scientific reasoning

inferring general concepts from given facts

Reading comprehension exercises would be useful in such testing.

(e) Clinical vs. Basic Science Prediction, and Criterion-Referenced vs. Norm-References Measurement

The MCAAP should clearly define the purpose of each type of test it proposes to develop. Particularly important in regard to cognitive tests would be the distinction between those geared toward prediction of basic science performance and those geared toward prediction of clinical performance. According to the MCAAP survey, the central region OSR representatives feel it most important for an admission testing program to predict clinical performance. It is our understanding that no test has been devised that successfully predicts the level of clinical skills, and we definitely encourage the MCAAP to perform the necessary research and study that might yield such tests. We feel that it would be most appropriate to score such tests on a numerical basis similar to the scoring of the present MCAT.

It must be pointed out that although most (two-thirds) of us indicated that it would be "important" for an admission test to predict performance in medical school basic sciences, we made this choice principally because of the hard fact that under the system of medical education that presently prevails at most schools, a student must pass basic science courses if he is ever

to become a physician. While we feel strongly that the competent clinician must have a solid knowledge of the fundamentals of the basic sciences, we feel that these "fundamentals" comprise a much smaller body of information than what is presented in the typical basic science curriculum. Hence, most of us place no importance on the distinctions among course grades given in basic science courses. Thus, we strongly recommend that all tests whose principal function is to predict performance in basic sciences should be constructed and scored on a criterion-referenced basis, with such scores as "qualified," "marginal," and "unqualified." In other words, we believe it is important for an admission test to predict whether an applicant is good enough to pass basic science courses, but not important to predict the actual level of performance in these courses.

C. Recommendations for Educational and Informational Program to Support Admissions Assessment Program

We feel that such a program must be an integral part of the MCAAP, and that publications should be developed that are appropriate for the needs of applicants, pre-medical advisors, and admissions committees. (Separate publications may be necessary for each group.) If non-cognitive tests are developed, particular attention must be given toward education admissions officers how not to misuse the results. The MCAAP must recognize, however, that if a test can be abused by admissions committees, it will be, and should not be confident that any educational program, no matter how good, will completely avert the problem.

D. Recommendations for Development of Non-Cognitive Tests

At this time, we do not support the incorporation of non-

cognitive tests into an assessment program, and we are extremely wary of supporting the development of such tests. We would like non-cognitive factors to play an increased role in the admissions process, but the development and existence of objective tests to measure these attributes would pose dangers far outweighing any possible benefits. We view the following as the most important negative points:

1. A test on which applicants would be scored for various personality traits would result in a group of medical students even more homogeneous than we have at present.

2. We would not be able to decide on even a single non-cognitive factor, as measured by objective tests, that would be considered "desirable" in all cases.

3. Non-cognitive factors to be measured should be associated with physician performance. Until we obtain meaningful indexes of physician performance, we cannot even study the question of associated non-cognitive factors, much less begin to devise an appropriate test.

4. One of the projected uses of a non-cognitive test is to predict medical career choice and place of practice. This subject has not been adequately studied, and no successful results have come to our attention.

5. There would be problems regarding validity. One problem of many non-cognitive tests is "fakability." Even if the MCAAP manages to conquer this problem (as may be accomplished via such tests as the EPPS, as Dr. Morris points out in the Central GSA position paper), there will always be the lingering problem of those privately offered (or occasionally college-offered) courses

that teach students "how to beat the so-and-so admission test." It is noteworthy that such courses seem to be successful in relation to the present MCAT, and have led at least one admissions officer to declare the MCAT invalid on this count alone. If a non-cognitive test is to be designed, the MCAAP would have to demonstrate conclusively that scores are "non-fakable" and "non-improvable" (except by significant personality change).

Since we do wish there were a fair means of assessing non-cognitive factors, we feel almost inclined to say, in spite of our skepticism, "go ahead, see if it's possible to develop such a test, then see if it works, and good luck." Bluntly, however, we feel that if such a project is begun, an objective test will result, no matter what, and, in view of all the contingencies we have cited, we feel that such a test would be a terribly dangerous weapon to have around. If non-cognitive tests are developed, the MCAAP and the AAMC must determine, to the satisfaction of all appropriate groups (COD, GSA, GME, AAHP, OSR) that the benefits override the potential dangers, and only then should the tests be incorporated into the assessment program.

As an important addendum, especially appropriate to the development of non-cognitive tests, we wish to point out that the concerns and opinions of minority group representatives must be given special attention, perhaps to the point of permitting such spokesmen virtual "veto power" over any aspect of a prospective assessment program.

One device that can be introduced rapidly and effectively, and which we consider to be useful in providing significant non-cognitive information about the applicant, would be a standardized biographical inventory. (Our response to the MCAAP survey indi-

cates that we considered application blank information, as well as personal interviews, to be more useful than national examinations in assessing applicants.) The most weight should be given to types of employment and meaningful extracurricular activities, which should, of course, always be considered in cognizance of the applicant's socioeconomic background.

E. Summary of Major of Points

1. Immediately substitute GRE for MCAT during development of new assessment program.
2. Devise tests of aptitude, not achievement, especially in science.
3. No breakdown of science test into sub-areas.
4. Use criterion-referenced measures for tests principally assessing basic science potential, and norm-referenced measures for those assessing clinical potential.
5. Emphasize predictors of clinical rather than basic science potential.
6. No support, at present time, for the development of non-cognitive tests.
7. Particular consideration must be given to minority interests at every stage of MCAAP development.
8. Biographical inventory as the most useful assessment too.
9. Make certain, as far as possible, that tests and scores are non-abusable by admissions committees.

POSITION PAPER PRESENTING RECOMMENDATIONS FOR
DEVELOPMENT OF AN ADMISSIONS ASSESSMENT PROGRAM
FOR MEDICAL COLLEGES

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Central Regional Conference
Chicago, Illinois
June 28-29, 1973



I. Level of Support

A. The Central Association of Advisors for the Health Professions (CAAHP) fully supports the development of a comprehensive admissions assessment program. CAAHP strongly endorses and applauds the organized and coordinated efforts of the Medical College Admissions Assessment Program (MCAAP) to investigate means of revising both the format and content of the present Medical College Admissions Test (MCAT). It is our hope that the MCAT can be made a more fair and useful diagnostic instrument for determining who shall and who shall not receive an acceptance to medical school.

B. In addition, CAAHP pledges its full support and cooperation in the development of the proposed Information Service for Preprofessional Advisors as tentatively outlined by the Division of Academic Information.

II. Recommendations for Development of Measures of Cognitive Behavior Tests.

A. Emphasis in test design should be upon aptitude as well as upon achievement, and should incorporate the technique of measuring reading comprehension.

B. Achievement examinations should be utilized in the area of the sciences and focus upon the following:

1. Subtests should be designed to evaluate the student's basic mastery and ability to actively think within the frameworks of the laws and theories of biology, chemistry, (inorganic and organic), physics, and mathematics.

a. A committee of faculty representing the Basic Medical Sciences (BMS), selected from both the undergraduate and

medical school level, should be assigned the task of determining the baseline of scientific principles and theoretical knowledge and comprehension of factual material deemed essential for a student entering medical school to have mastered.

b. Each subtest should be weighted according to its relative importance, as judged by the BMS Committee.

c. The test scores, in profile form (low, average, high) not using raw scores, for each subtest should be reported as separate items. The current form for reporting the "Science score" is too nebulous. For example, it doesn't tell the evaluator if the student is strong in biology, but weak in organic chemistry, etc. Also, the current "Quantitative score" doesn't indicate what specific areas of mathematics the student is strong or weak in.

2. The science section of the test should incorporate a reading comprehension instrument in order to measure the student's ability to identify problems and solve them through the utilization of the scientific method. The reporting of the test scores on this section should be designed to give separate measures of reading speed as related to comprehension.

3. Continuing item analysis reports of the basic science problems should be done in order to be sure that the examination is testing at the baseline deemed essential for students entering medical school. This feedback information should be given to the BMS Committee for their study in order that they may design questions that are relevant to the subject matter that is currently being covered at the undergraduate college level.

C. The current MCAT sections on General Information and Vocabulary should be eliminated and replaced with several reading

comprehension instruments constructed to eliminate cultural and geographical bias.

1. An alternative would be to use appropriate scores from the ACT and SCAT examinations, which the majority of American college-bound students are required to take for entrance and diagnostic purposes, in place of the present Vocabulary and General Information sections.

The validity of these tests has already been established on a large population of students.

D. Some attempt should be made to measure the individual's aptitude for organization, administration and team management.

E. Instruments should also be designed and included to measure one's ability to define the important, establish priorities, work efficiently, and organize diffuse material.

III. Recommendations for Audio-Visual Materials, Workshops and Other Supportive Services.

A. Succinct progress reports should be distributed to contributing groups at regular intervals for evaluation and recommendations.

B. Feedback questionnaires can be utilized with all groups to obtain additional suggestions and recommendations.

C. Workshops for refining of criteria and development of basic science and reading comprehension content should be organized for contributing groups at all levels with summary papers forwarded to Task Force representatives.

IV. Recommendations for Non-Cognitive Elements.

A. It is an essential goal that assessment of non-cognitive elements be directly related to the desirable personality charac-

teristics of a physician as they can be behaviorally defined, e.g. maturity; integrity; curiosity; ability to absorb anxiety; ability to communicate; motivation; ability to handle crises; "staying power."

B. Anecdotal reading passages could be developed based on real life situations which would not require black or white answers, but rather would require judgmental responses from the reader. The assessment of his responses would be used to construct an individual personality profile for the respondent.

Short films could also be used for this purpose.

V. Recommendations for "Up-keep"

A. Once the "new cognitive and non-cognitive MCAT" is ready for administration, a workshop program for medical school admission committee members should be established to deal with the interpretation of the "test scores." Such workshops are deemed essential for the avoidance of misunderstanding, misuse of non-cognitive test measures, and to avoid stereotyping of individuals. This workshop program should be offered each year so that new committee members can be kept informed.

B. Funds should be provided for biannual review of all testing procedures and necessary revisions.

1. It is further recommended that four years after the first use of the MCAAP, the non-cognitive part of the test be administered to graduating medical school seniors for a period of several years to determine what changes, if any, have taken place in the non-cognitive area after four years in a medical school environment.

VI. Concluding Statement on Position Paper.

In summary, the Central Association of Advisors for the Health Professions strongly endorses the proposal for revision of the Medical College Admissions Test. It recommends that the new examination place an emphasis upon assessment of aptitude rather than pure factual achievement; focus upon a baseline of essential scientific (principles) knowledge; the results of these tests be reported by specific subject area tested in a concise and useful form to both the student and admissions committee; eliminate the sections on Vocabulary and General Information, utilizing instead the appropriate ACT, SCAT scores and tests of reading comprehension; that the desired qualities of the practicing physician be behaviorally defined and non-cognitive instruments be designed to survey for these qualities; and that these scores be reported as a personality and character profile or within certain defined numerical limits to avoid stereotyping of individuals and misuse of data.

In addition, groups at all levels should receive feedback on a regular basis and have continuing input into the development and refinement of the testing program through the task force representative.



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Organization of Student Representatives

Association of Advisors to the Health

Professions



A POSITION PAPER PRESENTING RECOMMENDATIONS FOR
DEVELOPMENT OF AN ADMISSIONS ASSESSMENT PROGRAM
FOR MEDICAL COLLEGES

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A. Report of the Committee on the Medical College Admissions Test

At the June meeting of the Northeast Group on Student Affairs, as a result of concerns expressed about the use and development of the Medical College Admission Test (MCAT), a committee was appointed: 1) to review the MCAT, 2) to determine if there is a continuing need for this test, and 3) if the need exists, to make specific recommendations about its future development. The committee, composed of Prince Brigham (Temple), James Curtis (Cornell), Eugene Horn (Albany), Richard Mason (Rutgers), Thomas Meikle (Cornell), and David Tormay (Vermont) met twice in New York City; once in July with James Erdmann, Director of the Division of Educational Measurement and Research of AAMC; and once in Mid-October. In its deliberations, the committee paid particular attention to the recommendations of the March AAMC Workshop on the MCAT. The result of the committee's activities are the following recommendations which are submitted for consideration by the Northeast GSA:

The committee affirms a continuing need for a Medical College Admissions Test administered broadly to all applicants to American medical schools, but concludes that the current test and its general development and administration need significant modification. The first of the committee's recommendations deals specifically with the composition and reportage of the Medical College Admission Test and the final recommendation with its development and administration.

B. Recommendations for Modification of the MCAT

1. First, five separately-reported achievement subtests in mathematics, biology, physics, chemistry, and the behavioral and

social sciences should be developed and should replace the quantitative and science subtests of the current MCAT. In making this recommendation, the committee feels that the current MCAT is principally used as an achievement test indicating accomplishment by applicants in traditional areas of academic learning. This type of achievement test can be helpful in evaluating all applicants to medical schools and is needed especially for evaluating students from unknown educational backgrounds, for students who have been out of the educational process for some time, and for many students emerging from pass-fail grading systems. The committee feels that separate reportage of the results of questions in each of these areas of science will present a fairer evaluation of students with minimal science preparation and of students with incomplete science coursework at the time of the examination. Similarly, the committee endorses the recommendation of the MCAT Workshop that a subtest on behavioral and social sciences should be developed and included in the MCAT, reflecting growing interest by admissions committees about applicants' preparation in these areas. The committee feels strongly, however, that, like subtests in biology, mathematics, physics, and chemistry, the results of this subtest should be separately reported.

2. The committee recommends that the current verbal and general information subtests of the MCAT be discontinued as soon as possible and replaced by a single subtest which would evaluate communication skills, (reading, listening and observing) and problem-solving abilities. The verbal and general information subtests of the current MCAT seem to be biased against some minority students, many non-urban applicants, and many disadvantaged ap-

plicants and the committee feels that more relevant information about these areas could be extracted from personal interviews. The committee supports the MCAT Workshop recommendation to incorporate into the MCAT a new subtest evaluating the applicant's communication and problem-solving skills.

3. Third, since the committee feels that these newly recommended subtests might still be biased against minority students and other educationally disadvantaged students, we recommend continuing efforts to remove potential bias from the test and from the interpretations of test results. We further recommend that wherever possible the probable margin of such bias should be indicated.

4. Fourth, the committee recommends that the method of reporting the results of the MCAT to applicants and medical schools be changed.

(a) Specifically, the committee recommends that an applicant's performance on each of the subtests should be reported in terms of large achievement groups rather than by numerical scores as at present. This recommendation reflects the committee's concern that insignificant and meaningless differences in performance on the subtests are being incorrectly used to distinguish among applicants, particularly among those in the higher percentile levels. The committee suggests that scores might rather be reported as falling in one of three or four achievement groups and that these achievement groups should be "norm referenced", that is based on an individual's percentile performance within the total student body taking the examination, rather than "criterion referenced" in which arbitrary standards of acceptable performance are prescribed independent of the distribution of

performance on the examination. Although the committee is not prepared to make specific recommendations about the definition of these three or four levels of performance, it considered, for example, that level "1" might include all above the 80th percentile, level "2" all those between the 40th and 80th percentile, and level "3" all those below the 40th percentile on each of the subtests. The committee does not support the recommendation of the MCAT Workshop to substitute "criterion referenced" measures for "norm referenced" measures because it feels that the categorical terms used in reporting, such as "adequate, borderline, inadequate," might unduly restrict admissions committees in their use of the test in selecting applicants. In addition, the committee feels that admissions committees wish to know the gross ranking of the individual applicant among the total group taking the examination.

(b) However, the committee also recommends that for all scores falling in the lowest level, perhaps below the 40th percentile, the percentile performance should continue to be reported. These lowest scores, reflecting poor scholastic achievement, represent significantly increased academic risk in medical school and should be available to admissions committees.

5. Finally, the committee strongly supports the MCAT Workshop recommendation that a long-range research effort should be initiated and aimed at attempting to identify, perhaps, through a biographical inventory, some of the non-cognitive attributes of applicants, such as their attitudes, interests and motivations, which correlate with successful clinical performance. However, the committee feels very strongly that this effort should be developed as a rather restricted research program separate from the

MCAT and must not be incorporated into the MCAT until its significance is validated.

C. Additional Administrative Suggestions for Specific Change in the Structure and Reportage of the MCAT

1. The committee recommends that an advisory review board be formed consisting of representatives of the GSA and AAHP with continuing responsibility for advising the AAMC staff on policies relating to content of the MCAT, its administration, its present utilization and its future development. This recommendation reflects the committee's feeling, often expressed by GSA members, that the principal users of the MCAT should have increased input into the formulation of policy about the test.

2. The committee also recommends that the Division of Educational Measurement and Research of the AAMC prepare a brief, relatively non-technical guide for users of the MCAT, principally admissions committees of medical schools. The instructions should be simply worded to help admissions committees understand the purpose, capabilities and limitations of the MCAT. This recommendation strongly supports the final recommendation of the March Workshop on the MCAT sponsored by the Division of Educational Measurement and Research. In addition, the committee feels that admissions committees should have the opportunity at regular intervals to see actual or simulated copies of the MCAT to aid them in utilizing the test in evaluating applicants.

D. Summary of Recommendations

1. The MCAT be redesigned as soon as possible as an achievement test with the following changes in format:

(a) Five science achievement subtests in biology, physics, chemistry, mathematics, and the behavioral and social sciences

should be developed and reported separately to replace the current quantitative and science subtests of the MCAT.

(b) An achievement subtest dealing with communication skills and problem-solving ability should be developed and reported separately to replace the current verbal and information subtests of the MCAT.

2. In redesigning the MCAT, strong effort should be directed toward removing bias from the test and from the interpretation of test results.

3. The reporting of the results of the MCAT should be changed as follows:

(a) Performance on each subtest should be reported in one of three or four large achievement groups, which should be "norm referenced" and not "criterion referenced", rather than in terms of raw scores and percentile scores as at present.

(b) Performance in only the lowest achievement group should continue to be reported in terms of percentiles.

4. A research effort, separate from the Medical College Admission Test, should be initiated to develop a test which would attempt to predict the eventual clinical performance of applicants. After validation, this test might then be considered for incorporation into the MCAT.

5. An advisory review board should be appointed to assist the AAMC in determining policies about the MCAT.

6. A brief, non-technical guide should be prepared by the AAMC for users of the results of the MCAT, principally medical school admissions committees.

A POSITION PAPER PRESENTING RECOMMENDATIONS
FOR THE DEVELOPMENT OF AN ADMISSIONS ASSESS-
MENT PROGRAM FOR MEDICAL COLLEGES

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Task Force Conference
Washington, D.C.
July 12-13, 1973.



INTRODUCTION

The Problem and Possible Approaches

The need for a re-examination of the current Medical College Admission Test (MCAT) has been well outlined in the publication "The MCAAP Report" Volume 1, Number 1, February, 1973, and in the presentations by Drs. Erdmann and Angel at the 1973 Northeast Group on Medical Education (NEGME) Spring Meeting. In addition to the pedagogical reasons presented, there is a need to provide adequate career guidance for the increasing number of qualified pre-medical college undergraduates who are not accepted into medical school.

The Northeast Group on Medical Education understands the objectives of the proposed Medical College Admissions Assessment Program (MCAAP) as the following:

1. to provide a better, more effective, less costly method of identifying appropriate candidates for medical school;
2. to give more information both about the candidate and about the schools to which he applies;
3. to expand and to improve the counseling given by pre-medical advisors and admissions officers;
4. to provide information about alternative careers within the health sphere and to guide qualified candidates toward such careers.

The data from the 27 surveys that were received from the NE GME indicate that a national examination of the applicant's abilities, although an important factor in the assessment of a medical school applicant, was not given highest priority. On the contrary, college grade point average (GPA) and letters of

recommendation were felt to be of higher priority. Of equal priority to a national assessment program was felt to be biographical data and the use of the personal interview. This does not indicate that NEGME does not support the development of a comprehensive admission assessment program, but only that such should be assessed in relationship to the other data used to assess medical school applicants. NEGME supports the development of an extensive research and development effort for the MCAAP, but views with apprehension the "full-steam-ahead" approach to revision taken at the regional meeting.

The following brief discussion sets forth the basic assumptions which have guided the writing of this report.

The medical college admissions process may be viewed as a form of dialectic between organizations and individuals. The fundamental operating functions are institutional selection and individual choice. Each involves and influences the other, and each in turn is shaped or affected by the other. In a modern day concept of an admissions model there must be symmetry and recognition of the respective needs and responsibilities of each of the interacting parties.

Traditionally, primary attention in medical college, as in admissions generally, has focused on devising and improving procedures whereby a given institution may screen a finite candidate group possessing certain selection criteria from a considerably larger applicant population. Relegated to secondary importance in the admission process is the individual applicant's personal career planning and recognition of the developmental process involved in his decision to pursue a medical education.

While the admitting institution may perceive medical school admission as a single event, occurring at a clearly defined point in time, the admission decision for the applicant is but one key event concluding a phase in a continuing process of career planning and preparation.

For the potential medical student, a medical career involves "self-selection" as well as institutional admission or exclusion. A comprehensive model for a medical college admission assessment program should not only reflect the important need to screen the most promising candidate from a "natural" applicant pool, but should recognize the importance of influencing the size and quality of that pool. Such influences can occur only if there are interactions with students at antecedent points. Such a system, at earlier points, might well involve certain career planning information and services, and, ideally, would provide a motivational impetus to insure that students possessing desired attributes would self-select themselves into the applicant group, as well as to encourage redirection for those students less well qualified for medical college admissions.

Equally important for the ultimate goal of providing physicians, teachers, and researchers is guidance during the medical education process, as the individual makes sequential decisions concerning his future career.

General Recommendations

1. NEGME recommends the establishment of a MCAAP Board with representation from and appointed by the Council of Deans, the GSA, the GME, and the AAHP with responsibility for overall policies relating to the content of a future MCAT, its administration, its present utiliza-

tion, and its future development. This should include evaluation of proposals sent by potential contractors during the actual instrument construction as envisioned in Stage Two, and during any subsequent modification.

2. NEGME endorses involvement of faculty and staff of the medical schools and undergraduate colleges in the formation of "Test Committees" to set content for various parts of the examination in the recommendations to be outlined below. This is similar to the present approach of the National Board of Medical Examiners and the Graduate Record Examinations. Constant dialogue between faculty and the admissions offices in medical schools, and faculty and pre-medical advisors in the undergraduate colleges is necessary if the proposed MCAAP is to be responsive to the current trends in medical education and undergraduate education. The AAMC Division of Educational Measurement and Research should play a coordinating role in this regard.
3. The NEGME recommends that the Task Force and the AAMC staff study well the recent report of the Committee on Goals and Priorities of National Board of Medical Examiners (NBME) titled "Evaluation in the Continuance of Medical Education". Although individuals may disagree with the direction the revision of the NBME will take, the manner and process in which they are proceeding is basically sound. The emphasis on a research approach to the problem, so that institutions responsible for medical testing and evaluation will not only be content

with simply adapting in a straightforward way the educational measurement technology developed elsewhere, but also make basic commitment to research and development is laudible.

PHASE I

RECOMMENDATIONS FOR DEVELOPMENT OF MEASURES OF COGNITIVE TESTING

It is most important in these times of increasing diversity in the applicant pool and increasing individualization of medical school curricula to design and to use an admissions assessment test which informs the medical school of the student's preparation and enables the school to individualize the education of the students. Under these circumstances it is less important to use aptitude tests and more important to assess the student's achievement in basic academic skills and in sciences. The following suggestions are made:

1. Aptitude Tests

The aptitude tests should be eliminated. They have never correlated very well with grades beyond the first year of medical school; they have a cultural bias. Too often, they allow admission committees to distinguish among students on too limited criteria. If schools want these tests, they can use the college Board V-SAT and M-SAT scores which correlate very highly with the MCAT verbal and quantitative subtests. The time saved in test administration by eliminating aptitude tests will give more time to make the other tests more reliable and valid. The

general information test likewise should be eliminated. It has not been very helpful, perhaps has the largest cultural bias, and the time saved could be put into the other tests.

2. Achievement Tests

NEGME feels that data on achievement in the science specific subject areas, science survey areas, and the verbal and the quantitative skills areas are the most important items of data for admissions committees to know.

a. Achievement in the Basic Sciences

Biology. It is not possible to develop one test in biology which can cover the whole spectrum of what is taught in the nation's colleges. A perusal of the Educational Testing Service's (ETS) report of the contents of biology courses in a representative sample of the nation's colleges. I can convince anyone of this. Two or three achievement tests in biology should be developed, different in content, based on a survey of what is taught in biology courses in the nation's colleges. For example, in some colleges almost the entire content is molecular biology. the student would take the test that best measures what he or she was taught in college. This is already the procedure at the secondary school level where three separate courses have been developed by the Biological Science Curriculum Study.(BSCS). The student studies either the "blue" version, the "yellow" version, or the "green" version, each with differing content. He is examined on the one he was taught. The biology subtest of a revised MCAT should offer such a choice. The test results on a particular version of the biology achievement test should be reported as normative scores, and also in terms of the content of the test and the specific areas in which the student was

competent or deficient.

Chemistry. An Achievement test in chemistry should be in multiple versions, each related to the content of chemistry courses in different colleges, with a student choosing a version to correspond most closely to his or her college course. The results should be recorded as normative scores and in terms of areas of strengths and weakness.

Biochemistry. A test in biochemistry, equivalent to that taught in the first year of a medical school should be optional for students who have had a course in biochemistry in college. If they pass this test, they could be offered advanced placement in medical school. Nineteen of the 27 respondents to the NEGME questionnaire rated development of such an area important.

Physics . Surprisingly few of the respondents placed high priority on the inclusion of a separate physics assessment test. A test in physics might not be necessary if the test in fundamental quantitative skills contained problems in physics. Time would then be put to better use on other tests.

Use of other science examinations. NEGME recommends the exploration of the use of the Advanced Tests of the Graduate Record Examination Program as achievement tests in chemistry, biology, physics and mathematics in toto or in modified form.

b. Basic Academic Skills or Tools.

NEGME recommends developing the following tests:

Reading Tests. This test should measure and report the level of comprehension, vocabulary, speed and total reading scores. NEGME was almost unanimous in giving highest priority rating to the need for tests in reading comprehension.

Tests of fundamental quantitative skills. This test should consist of two parts: (1) tests of quantitative reasoning, problem solving and interpretation of data; (2) quantitative problems in chemistry, biology, physics and mathematics.

c. Tests in Sociology, Psychology or Other Behavioral Sciences..

The major subject of the first two years in medical school is "human biology." Tests in sociology or any other behavioral science should not be used because, for the time invested, they will not predict performance in the early medical school years. Time is needed to test other things. If spread too thin, none of the tests will be very good or very valid. The NEGME questionnaire showed that the social science and humanities areas were lowest in priority. Since most medical schools have no specific prerequisites in sociology, psychology, or other behavioral sciences, it would be difficult to assess the meaning of test results in these areas. The time spent in testing these areas could be put to better use.

3. Development and Use of Other Cognitive Data.

NEGME also recommends that studies be instituted into assessing a wider array of capacities for medical school entrance and reported as a profile to the medical schools. The criteria for establishing the validity of the new measures really ought to be not grades or achievement in school, but "grades in life" in the broadest theoretical and practical sense. Members responding to the NEGME questionnaire question #2 had strong agreement that the most important and desirable criteria to be predicted by an assessment program in the field of medicine was performance during internship and residency and as a practitioner.

There must be more attention paid to development of criterion sampling and reference mapping. The point is so obvious that it hardly needs belaboring; if you want to know how well a person can drive a car (the criterion), examine his ability to do so by giving him a driver's test. Do not give him a paper and pencil test for following directions, or a general intelligence test, etc. Criterion sampling means that those developing the test must get out of their offices (where they play endless word and paper-and-pencil games) and into the field where they actually analyze performance into its components.. If you want to know who will be a good physician, go find out what a good physician does. Follow him around, make a list of his activities, sample from that list in screening medical school applicants.

Criterion sampling, in short, involves both theory and practice and requires sophistication. To pick future physicians, medical researchers and health care managers, there will first have to be careful analysis of outcomes and then ways of sampling the adaptive behavior in advance. The task is not easy but the NEGME endorses research into analysis of this sort for the future development of measures of competent behavior. NEGME recommends that the developers of MCAAP collaborate with the National Board of Medical Examiners in the development of such criterion-based measures.

4. Comments

If the medical school had the above data, it would be possible to select students on a more objective basis and it would also be possible to build each student's medical education on the basis of his or her preparation.

Basic Skills. If the test showed that the student did

not fare well or that his or her quantitative skills were poor, review work could be given prior to entrance to medical school.

Preparation. There are colleges with almost no molecular biology; in others, almost the total content of the biology course is molecular. By having tests suitable to each student's preparation, and knowing how well he or she learned what he or she was supposed to learn, should make for a more accurate assessment of his or her ability to learn. Knowing what students have learned in biology courses, should enable any deficits to be overcome. If a student knew little molecular biology, not having studied it, and if a medical school thought this was important, he or she could take a summer course in this subject before matriculation into medical school.

Chemistry achievement tests results could be handled in the same way.

Tests in biochemistry would allow for advanced placement in medical school.

Criterion based tests would allow for a more accurate assessment of future directions in real life. One note of caution about criterion based tests looking for "life success", the predictability of any testing looking for long-range performance is bound to be much less than that at short range. Witness the problem with long-range weather forecasting!

NEGME recommends that prime consideration be given to the development of Phase I.

PHASE II
RECOMMENDATIONS FOR NECESSARY SERVICES AND
RESOURCES TO SUPPORT ANY ADMISSIONS ASSESS-
MENT PROGRAM TO BE DEVELOPED

NEGME strongly supports the proposal that a long-range effort be proposed to develop those supporting services which will make for more effective use of the assessment program.

This should take into account needs of students, pre-medical advisors, admissions officers, faculty and administrators related to career choice decisions of the admissions processes and other pertinent resources.

1. NEGME recommends strongly making "open" the admissions process in an effort similar to that done by the colleges with the help of the College Board Service. This involves putting into the hands of the student and the pre-medical advisor what happens at the admissions office. This might include making available as a hand-out to all medical school applicants, by school, the range and distribution of the scores of the applicant pool, a profile of the accepted class, and a profile of the entering class based on class rank, GPA, and the like. For the college seniors this would serve as a crude preliminary screening device.

2. NEGME also strongly supports development of student self-assessment and career counselling aids in an attempt to help students make a formal, rational career decision. The development of a preliminary screening device which would not only screen in or out, but would focus on the problems a student might

have, similar to the preliminary "mini" SAT, would be useful in this instance. It would be important to have the recording of such test data involve not only scores but also recommendations for future academic needs and current weaknesses. It might be advisable to explore the use of "flexi-level testing" as a self-administered, self-scoring test. Self-administered, tests or mini-tests would only be effective and helpful if there was a high relationship between scoring on these tests, remedial performance, and the subsequent actions of admissions committees. Certainly the concept of developing a "cooling off" period beginning in the junior year of college for those individuals who will not achieve admission into medical school is an important one.

3. NEGME also encourages development of a "file folder assembly service" for medical school applicants similar to that developed by the law schools--The Law School Data Assembly Service (LSDAS). While we recognize the inherent diversity in medical schools and their needs, the LSDAS appears to provide sufficient flexibility to be acceptable to over 135 law schools throughout the country. Under such file assembly service there might be developed a "locator" service in which a student is invited to identify himself in terms of certain objective measures such as home geographic area, background, educational aspirations, and the like. Schools electing to participate in this service would be able to specify certain selection criteria in various combinations and receive a mailing of labels listing the names and addresses of students with data which fit these selection criteria. For example, a medical school might be interested in

identifying black undergraduates from the six southeastern states who have indicated an interest in pursuing graduate study in primary medical care.

4. NEGME supports the development of publications on career choices in health. There is a need to centralize and coordinate a publication program which will address the problem of lack of adequate information. As a first component, we would encourage a series of coordinated volumes introducing the student to the general idea of health career education, describing the various fields in medicine and health and the career opportunities associated with them, and finally presenting a broad view of the institutions serving a particular field. An important component of such a series of publications would be an introductory volume directed mainly at freshmen and sophomores, but also recognizing that increasingly students enter medical education from avenues other than the traditional ones leading directly from the bachelor's degree. The purposes of the initial publication would be not only to motivate students to consider medicine as a career, but also to provide information regarding the general nature of the major health career fields of study at the graduate level, the types of professional careers to which they can lead and to sources of other information.

A second component in this program might be a series of complementary publications based on information now found in such books as the AAMC Medical School Admissions Requirements of the United States and Canada. These booklets would pertain to students who have become seriously interested in continuing studies beyond the baccalaureate level and are seeking to make a choice

of fields. For each field a separate booklet would be provided giving in as detailed a fashion as possible a description of the career opportunities in the field, the nature of the post baccalaureate educational prerequisite to it, the type of undergraduate experience necessary for admission to further study and so forth. Descriptive statements would be accompanied by a flow chart of the so called "critical path" and key decision points, if they exist, for a given career field.

A third component of this series might be directed at the student who, having selected a field for further study, wishes preliminary guidance in the selection of an institution. Some of this information already exists in the medical field. Suggestions made earlier in the section about "opening up" the admission process are pertinent here.

Undergraduate counselling must encourage the preparation of a "contingent plan". "What shall I do if I do not get into medical school?" There are at least two major difficulties in the use of early testing to deflect "less qualified" applicants. We are by no means certain what are minimal or optimal qualifications for entering students. Even the search for the uniformly brilliant and intellectual elite is now being called into question by statements that interpersonal compassion and empathy are more likely to be found in persons who find their major source of personal reward in social rather than in cerebral activity. Any early screening device (especially an impersonal paper-and-pencil method) may discriminate unfairly against a group of applicants that we have made recent efforts to encourage. These are all of the students who, because of "non-standard" early education or

socialization, or cultural membership, do not define themselves as aspirants to a career in medicine until late in their undergraduate careers. These include many non-white students, women, rural students, and those from very poor families. Many of these do not recognize their own potential, and thus their interest in becoming physicians until sometime later in their college years. They are "late bloomers" and will not survive an early screening system.

Once again, approaches to the problems listed above and their solutions must involve planning with those intimately involved in the advising and selection procedures.

PHASE III
THE ROLE OF NON-COGNITIVE
ELEMENTS IN AN
ASSESSMENT PROGRAM

The NEGME is ambivalent about the usefulness of the development of non-cognitive assessment measures. This is reflected in the results of the NEGME questionnaire, in the comments at the Spring Regional Meeting, and in the letters, both solicited, and unsolicited, sent to the Task Force representative. Nevertheless, it seems prudent to survey some of the non-cognitive measures currently used and indicate their suitability for future inclusion in MCAT, some of their strengths and weaknesses.

A number of efforts have been made in various areas of testing to find other ability tests that, when added to the battery, would improve the prediction of grades, and the typical result is that the multiple correlation is increased by only a negligible amount. Nevertheless, it is possible that certain types of non-cognitive measures would be useful in an admissions testing program. Just what is meant by "non-cognitive" is not always clear, since the only thing made explicit by the term is the exclusion of cognitive abilities. Presumably, when people make such suggestions they have in mind such things as motivation, interest, social ability, anxiety, and biographical factors. These characteristics cannot usually be measured by methods comparable to those used in measuring cognitive abilities. What methods of measurement are available in case we wish to add "non-cognitive factors" to the MCAT battery? The following methods have been used for measuring human characteristics of the sort

that fall in the domain of "non-cognitive factors": interview; letters of recommendation; ratings; inventory methods; performance tests; motivation; interests; personality; "cognitive styles".

Interview. The interview as usually practiced is a highly subjective and uncontrolled method of acquiring information and impressions. Unless the content of the interview is controlled, the topics covered will vary from interview to interview, which means that unplanned variations in content may affect impressions formed and decisions made, or even that the interviewee may control the conversation and impression-forming process. It is possible to develop highly structured interview methods that achieve reliable results. However, unless there is some special reason for obtaining the information orally, a written questionnaire would often serve as well.

Recommendations. It is common practice in admissions work to request the applicant's teachers or advisors to write letters of recommendation. Basically this kind of information is also highly subjective, except to the extent that the information conveyed and the recommendations made are based on factual information such as average school grade (in which case one might better obtain the factual information directly). On the other hand, the writer of a letter of recommendation may have had the opportunity to observe the candidate over a period of the years and may be able to make useful judgment about work habits, social adjustment, seriousness of purpose, and the like, that are valid and useful.

Ratings. A refinement in the use of subjective judgment is the rating scale which is a device for systematically recording

opinions by checking adjectives or marking points on a scale. Ratings can be accurate and valid under certain conditions: for example, if all raters observe the behavior of the ratee based as he or she responds to a standard stimulus situation. These conditions of course do not pertain in the medical school admissions area. But rating scales may improve judgment made by observers who had had adequate opportunity over a period of time to observe the performance of the candidate.

Inventory methods. The typical "personality test" is not a test at all; rather it is a set of questions to be answered by marking either "yes" or "no", or a set of propositions to which a candidate expresses some degree of agreement. It has become clear in many studies that the examinees tend to exhibit "response biases" that cast doubt on the wisdom of using questionnaire methods in such an area as medical school admissions. In a competitive medical school admissions setting where respondents try to make good impressions on the interviewer, they are likely, in varying degrees to chose answers that will put themselves in a good light. This is the well known phenomenon of "fakability" of personality inventories and is a serious objection to the use of inventory methods.

Performance tests. Any test can be thought of as merely a device to elicit the kind of behavior one wants to observe in order that the behavior can be evaluated or measured. One would have to devise appropriate situations for eliciting the desired kind of behavior and develop methods for making records of the behaviors for use in scoring. It is possible to set up performance tests in the non-cognitive domain, but in most instances,

such tests would probably prove to be impractical for a large-scale testing program; either cost would be excessive, or it would be difficult to conceal for very long the true nature of an otherwise feasible testing program. Problems of the invasion of privacy are also involved.

Motivation. Those who call for tests of non-cognitive factors are probably most readily concerned with how hard the student will work. In many studies pertaining to a variety of areas, academic performance seems to be higher for students who have better study habits, more favorable attitudes toward school, greater interest in the course area and greater degree of achievement motivation; who tend to be more independent, to have more impulse control, to have less anxiety in test taking situations; who are introverted, have a more positive self-image, have greater cognitive flexibility, and are less hostile and less defensive about revealing personal inadequacies. These findings are more representative of males than females in those studies which note the difference between them. The problem with this research is that differences among the groups are so small and tentative that they cannot be used for practical purposes such as medical school admissions. There have been other studies conducted on National Merit Scholars showing that personality measures do not add significantly to academic measures in the prediction of college performance. This writer shares these evaluations. Still another difficulty in measuring motivation is that one should ask "motivation for what?" Most of the measurement techniques seem inadequate for admissions testing. Methods that might be successful in small scale research projects probably would not work in a continuing testing program.

Personality. Personality like motivation has many facets. Little is known about the relationships of personality characteristics to academic success despite hundreds of investigations, most of which employ inventories or questionnaires to measure the personality traits. Regardless of the personality test employed, the question should be asked "Should we deny an opportunity to go to medical school to students on the grounds of possession of certain traits--not at all well defined or measured--that our value judgments deem desirable or undesirable?" The inclusion of items assessing personality and motivation in a revised MCAT may well expose the test to more intense--and more valid--challenges that it is culturally biased. If the use of the achievement tests may be charged to exclude unfairly some who would be good physicians, then the use of personality and motivation measures are probably still more biased. Studies are only now documenting the poor fit of some male personality measures to women. The same kind of bias undoubtedly exists for nonwhites. It would be imprudent to expose the AAMC or individual schools to this controversy at this point in time. A major problem here of course, is the definition of criterion variables--what end product do we want? How will we recognize him or her until the end product is specified? It is somewhat irrational to attempt a narrow specification of personality trait predictors. In addition, the range of options for careers in the medical profession are such that the use of personality traits might very well prove to be inadequate; for example, would any one doubt that the basic characteristics and personality of the radiologist differ from those of the pathologist, biomedical researcher, or pediatrician?

Cognitive Styles. Still another route to the study of non-cognitive attributes is through the identification of the individual's "cognitive styles". Including cognitive styles among non-cognitive attributes may at first appear paradoxical. This disappears however when the nature of cognitive styles is on considered.

Cognitive styles are the characteristic, self-consistent modes of functioning an individual shows throughout his perceptual and intellectual (that is, cognitive activities. The designation of "style" is used for these modes of functioning because they represent the person's typical approach to cognitive tasks. These styles are manifestations in the cognitive domain of still broader dimensions of functioning which extend across psychological domains including personality. In other words, "cognitive styles" speaks of both cognitive and personality characteristics. These broad stylistic dimensions may be picked up in the cognitive domain where they are easily identified and assessed by objective tests and by controlled laboratory procedures, and may also provide an objective route to personality study and assessment.

A number of cognitive styles have been identified. One of these--"field dependence-independence"--may be useful for further study in educational settings. The "hidden picture" puzzle is a familiar example of a method for measuring field independence. It should be made clear that scores on any test of field dependence-independence form a continuous distribution so that one is not dealing with two distinct types of human beings. In the perceptual domain, in the problem-solving domain and in the social domain, quantified scores may be obtained and

used to make a broad statement about the kind of person one is, encompassing both personality and cognitive functioning. It is not difficult to see the relevance of cognitive styles for a variety of educational issues. In the case of the field dependent for example, differences have been found between relatively field-dependent and field-independent college students in the majors they chose in college, their performance in various subject matter areas and the occupations they favor after college. An important difference may be noted here between a cognitive style approach and the usual ability approach to evaluation. In an ability approach, to have the ability is a virtue, to lack it is a deficiency; in a cognitive style approach, the emphasis is rather on identifying ways in which persons of contrasting poles of any style are different and the activities to which they are best suited. As an illustration, field-dependent nurses have been found to do well in psychiatric nursing where social skills are called for, whereas field-independent nurses have been found to do well in surgical nursing where analytical skills are more likely to be emphasized. These observations point out the potential value of "cognitive-style assessment" in a medical educational setting. Its value is more apparent at present for guidance than for admissions.

Development in the "non-cognitive" domain can be of little validity until more adequate criterion for measurement are established. This once again points out the need to develop criterion reference mapping. (See Phase I. 5).

Recommendations.

1. NEGME recommends that a long-range research and

development effort be initiated and aimed at identifying "non-cognitive" elements which might be included in any medical admissions assessment. The AAMC Committee on Measurement and Personality has already reported on this area.

2. NEGME recommends that this effort pay specific attention to the assessment of "cognitive styles," which appear to hold promise of being able to link the cognitive and non-cognitive.

3. NEGME does not view Phase III as an item of immediate priority and recommends that this effort be developed as a rather restricted research effort separate from Phase I and Phase II, not to be incorporated into MCAT until its significance is validated.

SUMMARY

General Recommendations

1. The data from the 27 surveys that were received from the NEGME indicate that a national examination of the applicant's abilities, although an important factor in the assessment of a medical school applicant, was not given the highest priority,

2. NEGME supports the development of an extensive research and development effort for MCAAP but views with apprehension the "full-steam-ahead" approach to revisions taken at the regional meeting.

3. NEGME recommends the establishment of a MCAAP Board with representation from and appointed by the Council of Deans, the GSA, the GME and the AAHP with responsibility for overall policies relating to the content of a future MCAT, its administration, its present utilization, and its future development. This should include evaluation of proposals sent by potential contractors during the actual instrument construction as envisioned in Stage Two, and during any subsequent modifications.

4. NEGME endorses the involvement of faculty and staff of the medical schools and undergraduate colleges in the formation of "Test Committees" to set content for various parts of the examination in the recommendations to be outlined below.

5. The NEGME recommends that the Task Force and the AAMC staff study well the recent report of the Committee on Goals and Priorities of National Board of Medical Examiners (NBME) titled "Evaluation in the Continuance of Medical Education."

Cognitive Testing

1. Aptitude Tests.

The Aptitude tests and the general information test should be eliminated.

2. Achievement Tests.

NEGME feels that data on achievement in the science specific subject areas, science survey areas, and the verbal and quantitative skills areas are the most important items of data for admissions committees to know.

a. Achievement in the basic sciences.

Biology. Two or three achievement tests in biology should be developed, different in content, based on a survey of what is taught in biology courses in the nation's colleges. The test results on a particular version of the biology achievement test should be reported not only by a normative score, but also in terms of the content of the test and the specific areas in which the student was competent or deficient.

Chemistry. An achievement test in chemistry should be in multiple versions; each related to the content of chemistry courses in different colleges, with a student choosing a version

to correspond most closely to his or her college course. The results should be recorded as normative scores and in terms of areas of strengths and weakness.

Biochemistry. A test in biochemistry, equivalent to that taught in the first year of a medical school, should be optional for students who have had a course in biochemistry in college.

Physics. A test in physics might not be necessary if the test in fundamental quantitative skills contained problems in physics.

Use of other science examinations. NEGME recommends the exploration of the use of the Advanced Tests of the Graduate Record Examination Program as achievement tests in chemistry, biology, physics and mathematics in toto or in modified form.

b. Basic Academic Skills or Tools.

NEGME recommends developing the following tests:

Reading tests. This test should measure and report level of comprehension, vocabulary, speed, and total reading scores.

Tests of fundamental quantitative skills. This test should consist of two parts: (1) tests of quantitative reasoning, problem solving and interpretation of data; (2) quantitative problems in chemistry, biology, physics and mathematics.

c. Tests in Sociology, Psychology or Other Behavioral Sciences.

Tests in sociology or any other behavioral science should not be used.

3. Development and Use of Other Cognitive Data.

NEGME also recommends that studies be instituted into

assessing a wider array of capacities for medical school entrance and reported as a profile to the medical schools. There must be more attention paid to development of criterion sampling and reference mapping.

4. Comments.

If the medical school had the above data, it would be possible to select students on a more objective basis and it would also be possible to build each student's medical education on the basis of his or her preparation.

NEGME recommends that prime consideration be given to the development of Phase I.

Recommendations for Necessary Services and Resources to Support Any Admissions Assessment Program to be Developed.
(phase II)

1. NEGME strongly supports the proposal that a long-range effort be proposed to develop those supporting services which will make for more effective use of the assessment program.

2. NEGME recommends strongly making "open" the admissions process in an effort similar to that done by the colleges with the help of the College Board Service

3. NEGME also strongly supports development of student self-assessment and career counseling aids in an attempt to help students make a formal, rational career decision. The development of a preliminary screening device which would not only screen in or out but would focus on the problems a student might have, similar to the preliminary "mini" SAT would be useful in this instance. It might also be advisable to explore the use of "flexi-level testing" as a self-administered, self-scoring test.

4. NEGME also encourages development of a "file folder assembly service" for medical school applicants similar to that developed by the law schools -- Law School Data Assembly Service (LSDAS).

5. NEGME supports the development of publications on career choices in health. Three components are identified.

6. Undergraduate counseling must encourage the preparation of a contingent plan: "What shall I do if I do not get into medical school?"

7. Approaches to the problems listed above and their solutions must involve planning with those intimately involved in the advising and selection procedures.

Recommendations Concerning The Role of Non-Cognitive Elements in an Assessment Program. (Phase III)

1. The NEGME is ambivalent about the usefulness of the development of non-cognitive assessment measures. This is reflected in the results of the NEGME questionnaire, in the comments of the Spring Regional Meeting, and in the letters, both solicited and unsolicited, sent to the Task Force representative.

2. The NEGME recommends that a long-range research and development effort be initiated and aimed at identifying "non-cognitive" elements which might be included in any medical admissions assessment.

3. NEGME recommends that this effort pay specific attention to the assessment of "cognitive styles," which appear to hold promise in being able to link the cognitive and non-cognitive.

4. NEGME does not view Phase III as an item of immediate priority and recommends that this effort be developed as a rather

restricted research effort separate from Phase I and Phase II,
not to be incorporated into MCAT until its significance is
validated.

A POSITION PAPER PRESENTING RECOMMENDATIONS FOR
DEVELOPMENT OF AN ADMISSIONS ASSESSMENT PROGRAM
FOR MEDICAL COLLEGES

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Washington, D.C.
July 12-13, 1973



The Northeastern Region of the OSR does not support the concept of developing a comprehensive admissions assessment program as it is currently proposed. There were no votes in favor of the present plan of development.

Though the OSR agrees that "the lack of services to many geographically and economically depleted areas suggests a major shortcoming in our provision of talent and technology with widest beneficial effect in relieving the problem of inadequate health care," we do not believe that this can be construed to mean that the admissions process is in any way at fault. This opinion is based on the limited research available which indicates that no predictive criteria regarding choice of specialty and place of practice exist with any significant degree of correlation before the third year of medical school. Because the research to date indicates that role models and practice experience are most important in determining the student's choice of specialty and place of practice, we feel that it would not be worthwhile to use any predictive tests on college seniors as criteria in the admissions process.

We do recognize that the present system of admissions places an excessive work load on admissions committees. In part, this work load is due to the sheer volume of applications to be acted upon, resulting at times in decisions of acceptance or rejection being based on erroneous or insufficient data. The proposed program of assessment as it is presently conceived, involving the use of both cognitive and non-cognitive test results as admissions criteria would not lessen the volume of applications, but it would conceivably (though we feel dangerously) make the job of admissions committees easier by giving them what is defined as a

legitimate source of rejecting applicants. Though the work of admissions committees is difficult, we do not feel that a test which cannot have predictive value when given before the third year of medical school could be instituted justifiably under the guise of making the admissions process easier for medical schools. Though we do not feel that scrutinizing of applicants by the admissions committees should involve less work, we do feel that the process could be made more efficient by limiting the number of applications any one applicant could make. An applicant might be limited to five applications, not being allowed to make more applications until he had been rejected by all five schools to which he applied. This would ease the "numbers burden" of the admissions committees, giving them more time to fully assess each applicant. It would also alleviate the sometimes inordinate amounts of money being spent by some college seniors in applying.

There are other dangers inherent in using non-cognitive test results as admissions criteria. Because non-cognitive factors are abstract in nature there are many different questions that can be used in attempting to measure them; however, the "correct" answers to the non-cognitive questions can also be abstracted and applied to any questions devised. This would make it easier to beat the non-cognitive tests than it currently is to beat the MCAT (i.e. Kaplan's course). Applicants might be taught how to answer questions in a way that would give them high motivation scores or any other non-cognitive factor scores deemed desirable by admissions committees. Because these Kaplan type courses are sure to spring up (Sutton's Law), and because expense would prohibit their being accessible to applicants unable to afford

them, they would perpetuate and increase the economic homogeneity and stratification that the MCAAP hopes to alleviate.

We recommend that the MCAT should be revised in such a way as to constitute a test that measures only achievement. We also recommend that those areas of achievement tested be explicitly and extensively defined and that those definitions be made available to the pre-medical student as early in his college career as possible. We further recommend that those areas of achievement tested encompass only those areas minimally required for application by U.S. medical schools. This is to insure that pre-medical students remain able to qualify for the MCAT and medical school admissions without jeopardizing the possibility of their majoring in any field of study. We also recommend that the limited usefulness of the MCAT in the admissions process be clearly, explicitly and repeatedly defined and made available to medical admissions committees.

In summary we feel that the "non-cognitive" aspects of the MCAAP proposal should be abandoned with the MCAT being restructured as an achievement test. We also recommend a limit be placed on the number of applications filed per applicant.



A POSITION PAPER PRESENTING RECOMMENDATIONS FOR
DEVELOPMENT OF AN ADMISSIONS ASSESSMENT PROGRAM
FOR MEDICAL COLLEGES

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The Association of Advisors for the Health Professions (North-east) held its annual meeting from June 19 to June 21, 1973. At that meeting Mr. James L. Angel, Program Director of the Medical Colleges Admissions Assessment Program, made a presentation of MCAAP for the membership, after which five panels separately considered problems of admissions to medical schools, particularly from the viewpoint of the premedical advisor. Each panel was assisted by representatives of the Northeast Group on Student Affairs of the AAMC. A plenary session then heard reports from the five panels.

No attempt was made to reach consensus at that session. On several questions similar points of view were recorded, and these constitute the "position" of the AAHP. Numerous problems which plague premedical advisors were aired, and are here noted in the hope that a new admissions assessment program will help to ameliorate them.

A. The MCAT

As one might have anticipated, there is substantial discontent with MCAT and the ways in which it has been used:

1. Is the purpose of MCAT clearly recognized now? There seems to be an ambivalence about its function: Is it to be a measure of achievement, or a predictor of success in medical school and after? It is felt that MCAT no longer serves the purpose it did in the late 1940's and the 1950's, when the curricula at medical school were more standardized. In that period, MCAT was a good predictor of success in the first year of medical school.

2. How is the MCAT score used? It is suspected that it provides another number for admissions committees, under the pres-

tures of vast armies of applicants, to invoke for some arbitrary cutoff procedure. At present, in the attempt to use MCAT as the basis for a national rating system, no allowance is made for variations in the geographic, economic, or cultural backgrounds of the applicants.

3. Does MCAT add knowledge not available from other sources? Do the verbal and quantitative scores differ substantially from the respective SAT scores? What does the General Information score reveal that cannot be learned from the grades in the applicant's nonscience courses? And there seems to be little relation between the science score and performance in science courses.

4. How should the MCAT scores be used by the premedical advisor? Clearly the answer depends on how they are used by the admissions committee.

5. Any science achievement test should reflect recent and continuing changes in the way in which science courses are taught in college. There is some feeling that the score on a science achievement test should not be broken down into subcategories, e.g. biochemistry.

6. To lend credibility to any test, the formulators and their credentials should be made public.

7. One of the five panels was in favor of scrapping the present MCAT immediately, and of not replacing it until one demonstrably better suited for the purpose of prediction of success in medical school and in medical practice is developed.

B. Other Testing Devices

1. There was widely expressed lack of confidence in, and suspicion of, all non-cognitive testing in its present state of development, insofar as such testing might be used by admissions

committees. On the other hand, this negative judgment is not one of principle. Indeed, the MCAAP is urged to encourage the development and evaluation of such tests, with the goal of their playing some role to be determined when appropriate.

2. It was felt that an assessment package, for the use of potential applicants and perhaps their advisors, should be developed by MCAAP. It would include a self-administered test, probably heavy in non-cognitive areas, and be used by potential applicants early in their college career; in the freshman or sophomore years. Hopefully, such a package would help to discourage those whose personality, motivation, or interests clearly are unsuited to a career in medicine, and early enough to minimize the waste that a premedical program might entail.

C. Communication between Medical Schools and Advisors

A broad MCAAP could be of substantial assistance here. Among the suggestions are the following. (Some of these may not be directly related to MCAAP, but this provides an opportunity to express them.)

1. There should be a routine, annual report to the premedical advisor of each college giving the following information on his applicants:

- (a) Where did they apply?
- (b) Where were they accepted?
- (c) Where will they attend?
- (d) What is their progress in medical school? In What areas was their undergraduate preparation inadequate?
- (e) Copies of internship letters.
- (f) Internship hospitals.

Much of this should be easily retrievable from data banks.

2. Inform the premedical advisor of the factors involved in the non-acceptance of applicants.

3. Make available to the premedical advisors all of the information on each of his applicants that is available to the admissions committee.

4. Establish a joint committee of GSA and AAHP in each region, to meet regularly during the year in order to air and discuss common problems, and to propose action to their constituencies. Devise mechanisms for developing an awareness of (and perhaps participation in) the activities of the premedical advisory committees by personnel from medical school admissions committees.

D. Other Suggestions and Questions

1. How can the applicant and his premedical advisor be assisted in selecting the "right" medical schools to try? It would be most useful to develop reliable and up to date information on each medical school and its characteristics. A candid statement for each medical school on the profile of its classes and on selection factors would be especially valuable.

2. On the AMCAS form, provide the applicant with the opportunity to offer an explanation if he feels that his calculated GPA does not do him justice. (Is the GPA the most important factor in reaching the interview stage?)

3. Discard the present form now used by the applicant to calculate the GPA and to list courses. Devise a uniform transcript (to be completed by the applicant) and to be used both by AMCAS and non-AMCAS schools.

4. In view of the proliferation of different grading systems in the colleges, is comparative achievement measurable?

5. Ingenuity must be exercised to reduce the number of ap-

plications as well as applicants.

6. It is incumbent upon advisors to develop more communicative evaluation letters, in view of the numbers and diversity of applicants.



M C A A P
SOUTHERN REGION
POSITION PAPERS

Council of Deans

Group on Student Affairs

Group on Medical Education

Organization of Student Representatives

Association of Advisors to the Health
Professions



A POSITION PAPER PRESENTING RECOMMENDATIONS FOR
DEVELOPMENT OF AN ADMISSIONS ASSESSMENT PROGRAM
FOR MEDICAL COLLEGES

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INTRODUCTION

At the time this paper was being written, the MCAAP survey of the opinions of the Southern Council of Deans was not available. We did, however, receive it recently. This paper was not built around the survey; but we have tried to indicate by footnotes or insertions in the text, points relevant to the survey and those on which we represent a minority opinion.

Considering the early, formative stage at which the task force is operating, we have tried to give primarily broad positions and directional suggestions which might lead to more specific recommendations as the task force operation evolves.

A. GENERAL POSITION ON ADMISSION INFORMATION

The information of grades, biographical facts, extra-curricular activities, etc., presently available to admissions officers is both adequate and helpful. A revision and expansion of the MCAT testing procedures is necessary, however. This is true for four reasons:

- I. The present version of the test has demonstrated some validity in terms of predicting dropping out of school; and, in some schools, in terms of prediction of academic performance. Results in other schools, however, have been poor. Gough's (1971) summary of a number of MCAT prediction studies reported median correlations with academic success so low as to have little predictive value. The few efforts to relate test scores to post-medical school performance have been essentially failures (1).

II. The national overview is that the demand for quantity of physicians will slack off in the next decade. The emphasis will then shift to such foci as quality, ensuring a balance among specialties which is proportionate to health needs and to producing physicians who will practice in geographic areas or among sub-cultures where health care is presently inadequate.*

It is doubtful if the present MCAT format is adequate to aid in admission decisions relevant to such matters.

III. Serious questions have been raised about the appropriateness of tests like the MCAT for assessing the potential of members of minority groups who come from backgrounds featuring markedly different cultural patterns, as well as such factors as early sparse exposure to vocabulary-building experiences and/or poorer early academic environments. A national organization of black psychologists has called for a moratorium on the testing of minority groups until further research and appropriate test design has been accomplished. A succinct criticism of such tests' measurement of minority subjects' potential was recently made by a black test construction

*The Southern COD survey reveals 95% agreement with the idea that a candidate should show "general concern for social needs" which we would take to indicate awareness for meeting health needs for the medically deprived sector. Only 32% agree that he could possess a "predisposition for a certain type career," however. This may mean that many do not agree with the view that emphasis will shift to type of specialty choice. To the extent we focus on this, we are possibly representing a minority, but firmly believed, view.

expert, "It's like a rubber band. The test may tell you how long it is now, but not how far it will stretch."

There is an obvious need for research and possible test re-design in regard to this issue.

IV. Medical schools are becoming increasingly concerned with the flexibility of curricula which will allow special treatment for exceptional students, "exceptional" meaning both superior students and those with academic weakness. There is a need for screening instruments which will both identify the student who merits advanced placement or other speeded programs and those which can diagnose academic or basic learning-skill weaknesses so that these may be rectified.

B. COGNITIVE RECOMMENDATIONS

I. Make the test more diagnostic, both for purposes of judgments about advanced placements and academic or cognitive weaknesses. This might involve: (a) Following Funkenstein's [2] suggestion that the science section be split into sub-sections of biology, chemistry, and physics, with separate scores for each. The range of difficulty should either be sufficient to allow a student to demonstrate merit for advanced placement, or supplementary tests could be offered for those wishing to take them. (b) Include a section testing for deficiencies in the basic factors which underlie the ability to learn. Though both basic vocabulary and reading comprehension skills are certainly influential in present MCAT performance, the single score produced confounds them with

the reasoning skills required by the tests. We would leave the choice of these tests to remedial experts.*

II. Explore what cognitive abilities predict performance in the clinical years. The concept most in fashion in regard to cognitive demands on the medical student is that of "problem solving." Certainly, careful thought should be given to the definition of this concept, its measurement, and its emphasis in the MCAT. Descriptions of the present format suggest that the test, like most aptitude tests, heavily measures "reasoning" in the vocabulary and quantitative sections [3]. The other sections are described as sampling breadth of memory for either facts or principles, with some emphasis on problem solving in chemistry and physics. We would raise two questions: (1) Is the emphasis on problem solving sufficient in these last two sections; and most important, (2) Are the kinds of problem solving and content involved related to those mental operations the clinicians must perform in diagnosis and treatment?

In this latter regard, we would offer a suggested direction of investigation. A tremendous amount of psychological research has been devoted to isolating and defining specific mental abilities -- as opposed to a "general" intellectual factor, as implied by the single

*The Southern COD heavily favors knowledge about a candidate's biology, physics, chemistry, and math skills. They split much more on other science areas (cell biology, physiology, etc.) A large majority favor assessing reading and study skills. We would read this to indicate that they would agree with our emphasis on diagnosis of learning defects, but that many are either less concerned with advanced placement tests or feel they could give them at their own schools.

I.Q. score in the typical intelligence test. J.P. Guilford [4] has developed a logical system for classifying mental abilities which involves classifying tasks in reference to classes of (a) the type of content involved, (b) type of mental operation employed, and (c) type of product required of the mental operation. Using this system, he has deduced that it is possible that there are 120 separate intellectual ability factors. He feels that 60 of these have been defined in that tests to measure them have been created and statistically validated. These include many varieties of problem solving tasks. We would suggest that skilled clinicians should interact with experts in this area in an effort to identify factors which might closely relate to clinical skills and (with an eye to the future) to aptitudes for particular specialties. Research should obviously follow to validate the hypotheses developed.

III. Explore possible measures of memorization and retention abilities. Medical education demands the rapid ingestion and retention of a large body of factual information. All the present sections of the MCAT certainly sample memorization to some extent, but it would be worth considering whether a more specific test of this ability could be developed. Two directional considerations might be offered. Much of the memorization in medical school involves either a combination of auditory intake and written material (lectures being transcribed into notes for further study) or pure auditory learning

(comments by faculty during the clinical years). Guilford's work has isolated nine different memory factors involving different sense modalities, modes of operation and content materials. We would suggest exploration of such memory factors as they might be related to the learning of medicine, with a special concern for memorization abilities involving auditory intake.

The critical question in regard to memorization ability measure is whether tests are available, or could be created, which would predict long-term retention as well as immediate. It remains to be seen if such tests are possible. Certainly, investigation along this line seems warranted, however.

IV. Research the "power" versus "speed" components of the MCAT. A current description of the test states that it is a power rather than speed oriented instrument [3]. With, for example, 86 items in 60 minutes for science and 75 in 20 minutes for vocabulary, we feel this statement is debatable. It is probably particularly debatable in the case of the disadvantaged student. It is probable that time pressures may particularly penalize the person with vocabulary or other basic learning-skill deficits -- thus giving a distorted picture of potential. Research should be done with such students operating under timed and untimed conditions.

V. Possible inclusion of behavioral sciences material in the test. Some MCAAP surveys have shown approval of this. Knowledge of the sociology of health problems and

care, of psychopathology, and of skills involved in relating to patients would undoubtedly be of value to the entering medical student. However, most medical schools have some teaching in these areas in their curricula. It is doubtful if colleges are homogenous in what course and content they offer in "behavioral science," or if all students will take such courses. In view of this, the present writers would feel doubt about the practicality, and that the time allotted for testing could be better used.

C. SUPPORT FOR ADMISSIONS PROCEDURES TO BE DEVELOPED

If some of the above suggestions come to fruition, there will be a clear need to educate those concerned with admissions in regard to the meaning of new testing procedures. Workshops and written materials would be valuable, but have the liability that the former may or may not be read and that the latter can only be attended by limited numbers. Those attending meetings will have varying amounts of expertise in the terminology and concepts related to interpreting tests, but will bear the burden of conveying information to others concerned with admissions. It might be suggested that MCAAP representatives be available to visit schools directly, where they could give-and-take with all concerned faculty.

If the new procedures involve the diagnosis of academic or basic-skill deficiencies, and/or measures related to specialty choice, MCAAP experts should be prepared to advise schools on setting up efficient remedial programs and counseling services in regard to specialty choices.

D. NON-COGNITIVE FACTORS

Measures of personality, attitudes, and values might prove to be valuable both in predicting clinical performance and specialty choice. Gough [1] has reviewed a number of promising research efforts in regard to performance and there is some evidence that success could be gained in specialty prediction [5,6]. We will confine ourselves here to naming some possible variables of interest, with little specification of particular tests or methods of measurement. We will also make some general methodological points.

Variables:

Confidence in decision making and sense of well being.

These are somewhat separate but overlapping, and probably mutually interdependent, variables.

Cochrane [7] brings together several lines of reasoning and literature review to reach the conclusion that confidence in decision making is essential in satisfying several of the motives common to those in medical practice. He presents indirect evidence that this variable may relate to specialty choice. Such attributes have also been found to predict superior performance among students [1].

Need to help people.

This concept might be treated under several names: need nurturance, people orientation, concern for others, etc. It has been shown to relate both to medical student and actual physician performance, and to specialty choice [7]. With the increasing emphasis on both selecting students

for particular specialties and for their willingness to serve particular sectors of the community, some such variable might become an important predictor.

Two other variables which have been shown to be relatively strong among medical students are Need Achievement (need to do well, to succeed in accomplishing difficult tasks) and Need Endurance (to work hard, to persevere and overcome obstacles) [7]. It follows that these variables might be useful in selection.

The variables described above are almost all included in Murray's need-press approach to describing personality. This system has been adapted to projective and objective tests and an adjective check list approach. In one form or another, it has been used in considerable research in medical settings. We have mentioned only a few of the needs in Murray's system. Others may be of equal, or greater, importance. Considerable research in medical settings has also been done using objective personality measures derived by Harrison Gough [8]. These include some of the variables described above and many others of potential interest. Such variables as "Socialization," "Intellectual Efficiency," and "Responsibility" might certainly be relevant. We would advocate further consideration and research exploration with these concept systems.

Other potential predictors might be found in the realm of value and interest pattern, and vocational interest tests; both have been found to relate to specialty choice [6].

A particular concern of the Southern COD is the assessment of the applicant's "disposition for scientific pursuits." Such tests should have particular applicability to this area. This

could be explored. Another direction of approach for which data is already available would be the use of MCAT profiles (in contrast to absolute scale values) as is done in personality test interpretation. It is our impression that if the quantitative and science scores are higher than the verbal and information, this may indicate the desired attitudinal pattern (one would want a generally high MCAT, but with the profile as described). A wealth of data on past MCATs and both academic performance and whether students went into academic or research careers is already available; such research is immediately feasible.

In the listing above, we have stuck to fairly specific and identifiable dimensions in the non-cognitive realm. The COD survey reveals strong backing for a cluster of attributes concerned with the ability to communicate and work efficiently and sensitively with others. It is our opinion that these are complex, multidimensional concepts which will be best measured by either weighted combinations of several more specific test scales or by new tests constructed by methods to be described.

Such construction might be initiated using the empirical method used in designing such instruments as Gough's Medical Preference Inventory [1] and the MMPI [9]. This method involves writing an extensive list of likes, dislikes, interests, hobbies, etc., with a minimum of prior theory, and deriving scales based on how target groups (such as those choosing a particular specialty) can be discriminated from other groups by certain questions. In a field as uncharted as the one under discussion, we would strongly recommend that some efforts be devoted to such a non-theory-locked approach.

The construction and validation of new tests is both time consuming and laborious, however. The emphasis here is on both construction and validation. As scientists, we do not feel that new tests should be offered to admission officers because of their logical appeal or apparent validity based on their content. We would recommend that such efforts be begun. In terms of more immediate needs for test revision and/or supplementation, we have implied throughout our discussion that many well-established instruments exist for measuring both cognitive and non-cognitive attributes. The priority in test construction should probably be in (1) establishing suitable criteria for what we wish to measure and (2) applying sophisticated statistical techniques to see if prediction equations can be derived using instruments which are already available and well validated in other contexts.

CONCLUDING STATEMENT

In this paper, we have pointed out that revision and expansion of the testing related to admission procedures is a necessity. This is true because (1) the present MCAT has shown marginal and erratic success as a selection instrument, (2) the increasing emphasis will be on filling the demands for certain specialties and for physicians who will be willing to meet the need for health care in areas where it is presently inadequate, and (3) it is not clear that present procedures are appropriate and maximally useful for students from disadvantaged backgrounds.

Some suggestions as to possible predictor variables have been offered. These are tentative. In view of the wealth of possible cognitive and non-cognitive variables which are both capable of measurement and may be useful to admissions officers, we

would recommend careful and extensive discussion between medical educators and test experts prior to research commitments.

In regard to such research, we would also point out that medical school admission procedures probably ensure a rather homogenous student group at present. It may well be necessary to encourage and/or fund schools to deliberately increase the diversity of their student bodies to make possible research which will facilitate the eventual selection of students who will meet the emerging set of new needs.

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A POSITION PAPER PRESENTING RECOMMENDATIONS FOR
DEVELOPMENT OF AN ADMISSIONS ASSESSMENT PROGRAM
FOR MEDICAL COLLEGES

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July 9-10, 1973



INTRODUCTION

In order to facilitate the presentation of the information in this paper, the paper is divided into two distinct parts. The first portion is based upon data obtained from the MCAT Revision Opinion Survey of the Southern Group on Student Affairs; the second portion reflects the opinions of the Southern GSA Representative to the MCAAP Task Force, members of the faculty of his home institution and various representatives of the Southern Group on Student Affairs.

It appears to be a general consensus of opinion that the MCAT Test, as presently constructed, is generally inadequate as a predictor of success in medical school and still less adequate as a predictor of success in the practice of clinical medicine. This statement is made, not to imply that the test is of no value in predicting potential success in certain of the cognitive areas of medical training, i.e., Basic Sciences, but to emphasize the poor or questionable predictability of the test in regards to the desired quality of the end product of the training.

It is, therefore, incumbent upon medical educators and interested, related groups to re-assess the value of the MCAT as an instrument of success-predictability with the view in mind of modifying, supplementing or replacing it.

RESULTS OF OPINION SURVEY FOR MCAT REVISION

The following information is a verbal summation of the Opinion Survey for MCAT Revision from the Southern Group on Student Affairs.

A. High priority is given to the importance of information provided on the Application Blank. Almost the same amount of

priority is given to a National Examination of applicant abilities and Personal Interviews, although the latter is considered of more importance than the former.

B. There was universal consensus that effectiveness as a practitioner of medicine is a criterion area of paramount importance in any assessment program. Of almost equal importance is the effectiveness of the graduate as a clinician during his internship. In logical sequence, in a stepwise designation of importance, follow performance in medical school in the clinical sciences and, then, the basic sciences. Interestingly, the survey revealed almost equally-mixed opinions about the importance of the National Board Examinations in this regard. The areas of medical education and research, although reflecting a respectable priority rating, were uniformly relegated to a position behind the clinical practice areas.

C. In considering the areas of a candidate's academic achievement of utmost importance to Admissions Committees, the Survey selected Science-Specific Subject Areas with Science-Survey Areas running a close second. Quantitative skills were considered of next importance, followed by Verbal skills. Behavioral and Social Sciences and General Humanities, though important, were not considered high on the priority rating. The Survey also revealed that inadequate testing currently occurs for the Behavioral and Social Sciences.

D. Of the general academic areas listed in the Survey, the most important subtopics for admissions decisions were listed, in order of priority, as follows:

1. Behavioral and Social Sciences

Psychology
Sociology
Anthropology
Economics

2. General Humanities

Philosophy
Arts and Literature
History

3. Quantitative Skills

Quantitative reasoning
Arithmetic computation
Calculus
Geometry
Algebra

4. Science

Biology
Chemistry
Biochemistry
Physics
Cell Biology
Zoology
Genetics
Physiology

5. Verbal Skills

Reading comprehension
Writing or composition
Vocabulary
Verbal analogies

E. The Survey reflected the feeling that Admissions Assessment Programs should also evaluate motivation and the ability to logically analyze and synthesize information. These two areas were given highest priority and were also considered very important. Emphasis was placed on the importance of developing means for evaluating motivation. Career orientation and Self-image were considered of some priority but of less importance than the areas listed above.

F. Maturity was considered of highest priority when one

evaluated the most desirable personal attributes observed in medical students. Self-discipline, social concerns, leadership ability and disposition for scientific pursuits were considered important in decreasing order of priority.

G. In considering the admissions actions which might have the greatest positive effect on the quality of health care in this country, respondents in the Survey relegated highest priority to the detection of students with realistic views of the demands and responsibilities of a medical career. Approximately 50% of the respondents felt that more concern with non-intellective factors when selecting applicants assumed high priority in this regard. Of less, but still high priority, with considerable degree of importance, was the demonstration of more sensitivity to cultural differences in evaluating applicants. The provision of more student financial support assumed less priority and importance than the other items.

H. In considering factors that would most assist good admissions work, the Survey resulted in highest priority and importance to students having self-assessment and career-counseling aids. Manuals, Handbooks, Workshops, In-service programs and Audiovisual and other technological aids that informed students about the admissions process were rated of equal importance and priority.

I. The Survey indicated that more schools in the Southern Region had from 0 - 5% Chicanos than had Blacks whereas the majority of schools had from 5.1 - 10% Women. Two schools had 85.1 - 90% Blacks and one school had 25.1 - 30% Blacks and Women.

J. More of the respondents indicated that they are seeking

more Blacks and Chicanos than those that aren't, however, more schools are not seeking more Women than are.

OPINIONS

It is apparent from the Survey summarized in the above portion of this paper, that the following facts are truths in the admission procedure:

- A. That information provided on the Application Blanks is held in high regard by the majority of the respondents in the Southern Group on Student Affairs.
- B. That Personal Interviews are considered of extreme importance by members of this group.
- C. That competence in the clinical practice of medicine is a goal that should be sought for in all admissions to Medical Schools with the full realization that certain students will seek a career in academic medicine or research areas.
- D. That demonstrated competence in certain preclinical sciences is a definite criteria for admission to medical school.
- E. That familiarity or a certain degree of competence in the behavioral or humanistic sciences is a desired prerequisite for medical school.
- F. That motivation is a prime factor in success in medical school.
- G. That maturity is a prime factor in success in medical school.
- H. That social awareness is a desired characteristic of medical students.

I. That there is an increased need for minority students, i.e., Blacks, Chicanos, Women and others.

It is also apparent that the present MCAT test cannot provide the basis for admission of individuals that might meet all of the above-listed characteristics inasmuch as these criteria could not possibly be delineated by one defined test. It would appear difficult to construct a test that could categorize cognitive as well as non-cognitive skills and still retain a certain degree of reliability. Based upon the Survey, one might question the reliability of the cognitive skills determined by the present MCAT Test in regards to success as a medical student.

The fact remains that one might question the social responsibility of medical schools. Is it their function to produce graduates who walk in the image of their 'Ivory Towerism'? Is it their function to provide medical care to the general populace as they (the medical schools) view it? Is it their duty to provide medical care for the population as a whole, i.e., all segments of that population? Is it their duty to develop new systems of health care to insure a certain degree of medical care for all segments of the population? Is it their responsibilities to provide different tracts for qualified individuals of different interests to pursue in order to insure continued pure, basic and applied research in the medical basic sciences? Is it their responsibility to provide curricula that will satisfy the varied appetites of their students and the demands of an ever-increasing sophistication of consumers of the end-product of their efforts?

These are questions that must first be answered, or at least addressed to, by the Medical Schools and, then, by the

agencies that attempt to accredit applicants to these schools.

It would appear that the multitude of questions would require a multitude of methods to determine and categorize the individuals competent to become involved in training programs designed to answer these questions. This, then, would require more than one type of examination to selectively indicate those individuals capable of entering and, successfully completing, such programs.

It is the considered opinion of certain faculty members of this Representative's Institution that tests should be devised to determine motivation of individuals applying to medical schools. Motivation would appear to be a factor vital to the success of a student as a practitioner of medicine as well as an educator and researcher. If such an instrument could be devised to strengthen or supplement a test that determines cognitive competence, the predictability of success of applicants might be enhanced.

Social awareness should dictate to medical schools the need for providing medical care for all segments of our Society. Differences in cultural background, ethnic traits and group characteristics should indicate a need for devising instruments to determine those individuals of varied backgrounds who are best suited to provide these needs. This, then, addresses our attention to minority groups and the needs of such groups.

Cultural differences of minority groups may provide problem of communication. Such problems enter into any qualification or predictability-of-success instrument, designed for a majority group but required for a minority group. Criteria for entrance into the training program should probably be based, or at least

modified, by cultural differences even though the predicted end-product is expected to provide the same caliber of health care. Qualifying examinations, then, may have to be so designed as to take full advantage of cultural differences just as graduates have to be so trained as to relate to their cultural peers. This might require the necessity for supplementary areas to national examinations or multiple examinations that are culturally oriented

Designers of such examinations should also be of varied cultural backgrounds in order to minimize the communication gap that usually exists between members of different cultural groups. Such examinations should deal primarily with non-cognitive and motivational factors rather than cognitive aspects which are common to all groups.

A POSITION PAPER PRESENTING RECOMMENDATIONS FOR
DEVELOPMENT OF AN ADMISSIONS ASSESSMENT PROGRAM
FOR MEDICAL COLLEGES

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July 9-10, 1973



Introduction

This paper is divided into two parts. Part I reflects the data gathered from the MCAAP opinion survey and Part II reflects detailed opinions of the GME Southern Regional Representative - based in part on the MCAAP opinion survey. The Appendix contains a summary of MCAAP questionnaire completed by members of the Southern Regional GME.

Opinions of Members of Southern Regional GME

A. There was almost universal agreement that a revised admissions program is needed. It was also agreed that systematic longitudinal research and validation must accompany such an undertaking.

B. Cognitive Area.

1. The weakest area of the MCAT appears to be the general information section. The behavioral and social sciences section needs improvement with particular emphasis in psychology and sociology. The humanities component was also considered weak, but many considered this information to be of less importance.

2. The specific areas associated with the MCAT science test also appear to be inadequate. In particular, the individuals surveyed felt that biology was extremely important. Chemistry, the interpretation of scientific experiments, and cell biology were very important. Physics, physiology, and zoology were considered important.

3. The adequacy of the verbal section of the MCAT was questioned. The primary problem is in the fact that reading comprehension was considered extremely important by the respondents but was not a subtest. Even though the MCAT as a whole assesses

reading comprehension, many may desire a separate reading comprehension score in addition to verbal analogies and vocabulary. From a psychometric point of view, vocabulary is a large component of comprehension and therefore comprehension may be of little independent predictive validity. Writing composition should also be included in the test. Respondents considered ability to logically analyze and synthesize to be very important. Realism of an applicant's views of the demands and responsibilities of the M.D. career should be assessed. This, by definition, is related to knowledge of the demands and responsibilities of a medical career.

4. There was general satisfaction with the quantitative skills portion of the MCAT. A comparison of the ratings of various components of quantitative skills on the MCAAP opinion survey and the description of the quantitative skills portion of the test in the manual however revealed some discrepancy. The MCAT measures "ability to reason through and understand quantitative concepts and relationships in the areas of arithmetic, algebra, and geometry." Those responding to the survey indicated quantitative reasoning to be very important. The vague nature of the test description makes it difficult to evaluate what the test measures.

C. Support Services.

There are a number of ways the AAMC can assist the nation's medical schools in insuring the wise utilization of MCAAP and other admissions data. There is a strong need for workshops and inservice programs to familiarize admissions committee members with the complexity and implications of the admissions process. In addition, it was considered highly desirable for the students to have self-assessment and career counseling aids.

Manuals and handbooks describing the assessment plan are also needed.

D. Non-Cognitive

Respondents considered it very important to assess effective human relations, motivation, maturity, self-discipline, self-image and social concerns. Leadership ability and disposition for scientific pursuits should also be measured.

Recommendations Based on Survey Data, Discussions and Personal Observations

The forthcoming Medical College Admissions Program may play a significant role in improving health care in the United States. Medical schools flunk out relatively few students. Schools go to great lengths to retain those they accept. Those admitted are destined to become the future leaders of health care teams. How well will they function in new leadership and supervisory roles? Will the MCAAP help admissions committees identify those individuals capable of functioning in future health care delivery systems?

The success of admissions committees has been evaluated primarily on the basis of attrition. By this criteria, it would appear that they are doing a good job. Few would disagree with the fact that in past years, without "formulas" or "cutting scores," unqualified applicants were able to slip past the scrutiny of admissions committees. In those days, however, competition was keen to stay in school - 10%-20% of an entering class would flunk out. Now the success rate is far better. Is this success due to the use of "MCAT" and the high "GPA's" upon which most base their decisions, or is it a function of the reluctance of many faculty to fail students? What of those rejected by the

medical school admissions process? Many argue that large numbers of rejectees could survive the basic science years to become excellent physicians - the kind who do make house calls at 3 a.m.

Most admissions formulas are based to a large extent on studies predicting the criteria "performance in the basic science years." How many admissions committees base their formulas on data from predictions of actual performance in the wards and clinics? How many base formulas on performance as a practitioner or leader of a health care team? How many medical schools even systematically collect ratings on the many components which enter into most definitions of the successful clinician? Seven important factors are:

1. Intellectual process of obtaining information by history, physical examination and laboratory studies.
2. Problem-solving and clinical judgment - use of information to arrive at a diagnosis and develop a sound plan of management.
3. Implementation of management plan - takes account of socio-economic, personal and familial impediments.
4. Willingness and ability to establish effective relationships with patients.
5. Manual skill at technical procedures.
6. Interpersonal relationships with and utilization of the health team (students, staff, and paramedical and public health personnel).
7. Attitude toward professional responsibilities and understanding of the physician's role.

The primary purpose of MCAAP must be to improve health care

delivery by influencing the medical school selection and the pre-medical education process. Medical schools and residency programs can only do so much with those individuals entering their doors. Leadership on a national level is needed to assist medical schools in deciding who is to gain admission. This leadership should take several forms:

1. Develop assessment procedures which assist medical schools to select students on the basis of their expected performance as practitioners rather than limiting procedures to selecting students who will perform effectively in medical schools.
2. Provide test results to admissions committees in a form which will help them to make the decisions they desire.
3. Provide workshops and inservice programs to educate admissions committees regarding the limitations of and advantages to various types of admissions formulas.
4. Provide students with self-assessment and career counseling aids, thereby attracting candidates best suited for health professions and discouraging those who are likely to be unsuccessful.
5. Provide complete manuals and handbooks describing all aspects of the assessment program for consumption by different audiences: The medical school applicants, admissions committee members and interested faculty, the medical education personnel.
6. Develop a test which will have a facilitative effect on undergraduate study without "controlling the curriculum."
7. Conduct the necessary research to validate the MCAAP and

continuously explore new predictors of clinical competence.

The criterion performance upon which the MCAAP should be based must be the successful practitioner - a doctor delivering effective health care in one of the many health care delivery systems. It may be necessary to substitute a predictor of this criterion - performance in clinical years of medical school or during internship or residency. Performance in these settings differs in many respects from actual practice settings. Being a practitioner almost always involves far greater participation in the total management of health care delivery. For this reason, the criterion of ability to effectively manage and work with others must be independently assessed. The MCAAP must not ignore prediction of performance in the basic sciences. Perhaps the development of tests to diagnose potential problems in the basic science years may enable medical schools or undergraduate schools to provide remedial services or training in order to facilitate completion of the basic sciences.

In order to predict success as a practitioner, the first step should be a careful analysis of those skills and specific abilities which are prerequisites for becoming a successful physician given the nature of present medical school experience. There are two types of prerequisites for being a successful practitioner: 1) the skills and specific abilities needed to complete medical school and 2) the skills and specific abilities needed to be a good practitioner which are unlikely to be learned during medical school. A logical analysis of these two types of prerequisites should yield test descriptions which are operational so that the tests finally produced over successive years are more a function of the MCAAP revision advisory committees' blueprint than the

item writers who construct each year's items. A great deal of time and energy should be devoted to the careful definition of domains of test items to be included as MCAAP subtests.

Page 18 of the MCAT manual contains the rationale behind the present approach to admissions testing:

"General intellectual ability plus knowledge in the particular field of study have consistently been shown to be the most accurate predictors of success or failure in graduate study. Successful completion of the medical curriculum requires a certain level of intellectual ability and a background in the physical and biological sciences. The MCAT provides these kinds of information on applicants. As a standardized test of scholastic aptitude and achievement, the MCAT helps answer the question whether a student can, but not whether he will, successfully meet the intellectual requirements of medical school."

The focus is on general intellectual ability and knowledge - the prerequisites of success in school. There is little concern for other sets of abilities and skills - those not taught in medical school but which are needed to be an effective practitioner.

The first step in identifying the skills and specific abilities which the MCAAP should measure is to define the effective practitioner. Considerable effort throughout the country has been devoted to this end. Task lists, critical incident studies serve as a base for many of the documents produced.

The second step is the careful analysis of what is taught in medical school. This analysis would reveal a list of skills which

could be taught in medical school but which currently are not. The wisdom of teaching these skills or developing these abilities during the three to six years of medical school could then be judged. If judged difficult or time consuming to teach, a medical school could relegate development of these skills or abilities to premedical education or to remedial courses. The MCAAP should assess applicants to see if these skills and abilities are present, leaving the decision regarding what to do about the deficiencies to each individual school. Each of these steps must be carried out if we are to assure quality health care, care that comes from effective practitioners. The examples in Table I will clarify how this process may be used to identify key skills or specific abilities.

The process of carefully defining domains of test items to serve as a test blueprint will be time consuming. The need to collect systematic judgmental data about the type of test items to be used in the MCAAP must be stressed. There is a difference between GME representatives expressing an interest in finding out how applicants perform in an area such as Biology and the selection of those Biology items which may be considered to be prerequisites for successful completion of medical school and/or the successful practice of medicine.

The present plan for the MCAAP calls for a "cognitive" and a "non-cognitive" component. We should remember that this is an artificial dichotomy. Perhaps skills and abilities most important may be the successful performance of tasks containing both "cognitive" and "non-cognitive" elements. We should be sure not to exclude these tasks because we are urged to think in terms of cognitive and a non-cognitive portion of the program.

TABLE I

EXAMPLES OF POSSIBLE AREAS TO BE ASSESSED BY MCAAP

1. Many feel that the principles included in Cell Biology are important for the physician to know. This area is quite vast. A minimal level of knowledge in this area may serve as a prerequisite for entering some medical schools and therefore be an area for MCAAP testing.
2. Writing skill. Skill at writing is not specifically taught during medical school. Many clinicians tolerate disorganized progress notes and poor sentence structure. Few clinicians teach writing to medical students and almost all basic science examinations are multiple choice. If skill at rapid written communication is an important physician characteristic, then it should be assessed by the MCAAP.
3. Vocabulary. The physician must be able to rapidly expand his vocabulary because of new drugs, procedures, and scientific discoveries. This skill is not directly taught in medical school. Most would agree that it is absolutely essential for successful completion of the basic science years. The present MCAT tests the individual's present vocabulary and not his ability to acquire new words and concepts. The test should measure the skill needed to complete medical school and to become a good practitioner - that is, ability to acquire and retain new words and concepts. Near the beginning of the MCAAP testing session, examinees could be presented with material in which new words and concepts are presented. After a timed study period, students could be given other parts of the test. At the end of the test, two or three hours after being given the words, students could be tested for their ability to recall them. Such a test may be likely to be correlated with the present vocabulary. This test may serve as a more effective work sample.
4. Problem-solving. Many agree that the practice of medicine is primarily problem-solving. Because the educational research on problem-solving is limited, it is difficult to ascertain what specific skills might serve as prerequisites for medical school. I would suppose that an individual's approach to problems may be a relatively stable ability - relatively unchanged by medical school. Research in this area should be explored. The MCAAP should assess problem-solving skill.
5. Sexual attitudes and values. Does the medical school experience influence sexual attitudes and values? It has been recognized that physicians often fail to do sexual histories, fail to do pelvic examinations, and fail to provide sexual education for their patients. Sexual attitudes and values should be assessed. Some schools may wish to consider such data in making selection decisions.

The MCAT is a four-hour test. How long should we make the MCAAP? How much time should be devoted to each area? The answers to these questions should come from an analysis of the information needed to make intelligent admissions decisions rather than convenience to applicants or test developers. Medical applicants would probably subject themselves to a week of testing if they had to do so. Those rejected due to low MCAT scores would gladly have submitted to further testing if they felt it would help. Many graduate programs require at least a full day of tests. The cost to the public for Ph.D. education is far less than that of medical school education. The admission to medical school usually results in a lifetime of financial security. What devoted applicant would balk at spending two or three days taking tests? If the expense of testing becomes prohibitive for the poorer applicant, scholarships for the test could be arranged.

What of the racial-economic bias which many claim is present in the MCAT general information section? How can this bias be minimized? Should separate norms be developed for minority groups? Would a test of applicants' knowledge of different cultural-economic groups give some advantage to individuals coming from non-WASP environments? Would such a test penalize those applicants who have little awareness of how different people live? Knowledge should be identified which plays a role in how different segments of society see the health care delivery system, how the way they live effects their health, and how their life conditions make following the doctor's instructions difficult.

What of courses and books designed to help students do well on the MCAAP? Should applicants be able to train for any or all

parts of the MCAAP? The MCAT is designed so that training will produce only minor variations in test scores. Measures of general intellectual ability are usually not susceptible to training. If we design the MCAAP to measure specific abilities and skills, might the test be susceptible to training? If it is, what are the implications?

Individuals who improve their test scores through training and subsequently do well as practitioners are not of concern. Individuals who improve their performance through training and subsequently do poorly as practitioners are a major concern. What is the probability of this happening? If a reading comprehension section of the MCAAP were constructed so as not to be susceptible to training, I would question the test's validity. Certainly reading speed and comprehension are important aspects of success in medical school. If an individual is deficient in these areas and he is able to remedy this deficiency through training ... excellent. The probability that this as well as other skills or knowledge will be retained is great. These individuals may do well in medical school and as a practitioner.

Most agree that two individuals with the same GPA from two different schools are likely to possess different levels of achievement. Some medical schools rank the quality of colleges in order to derive a weighting system to adjust grade point averages of individuals. A standardized achievement test may prove to be useful to admission committee members. The achievement sections of the Graduate Record Examination have served this function for Ph.D. programs. The MCAT is a combination of aptitude and achievement, making score interpretation difficult.

Verbal and quantitative ability should be reported separately from science achievement or achievement in other areas.

Members of the AAMC staff have suggested that the MCAAP be a criterion-referenced test. I am not sure I know what they mean by this term. I am convinced that more than norm-referenced data should be provided to score users, and if this is what they mean, excellent!

Nonintellective testing is an exciting new horizon. Here, too, we must start with a definition of the practitioner, working backward to define the personal attributes of those which should be selected. We should not limit ourselves to paper and pencil tests. Work samples, cooperation exercises, simulations and situational tests may provide the types of information needed. Both logical analysis and extensive research are needed in this area. The problems of faking and teachability must be explored.

The role of the premedical advisor in the admissions process should be examined. Are there ways the AAMC can work with these individuals to improve the quality of the information they provide? Could the AAMC provide standardized recommendation forms to be used by all colleges and universities? Incompatibility of recommendation forms makes the utilization of the data difficult.

In summary, the MCAAP may play a significant role in improving health care in the United States. A careful analysis of the two types of prerequisites for becoming a successful practitioner must be carried out. This analysis should yield operational definitions of skills and specific abilities to be examined. Examination length should not be a prohibiting factor in plans to design the MCAAP. Stress should be placed on providing

the needed information about applicants.

MEDICAL COLLEGE ADMISSIONS ASSESSMENT PROGRAM
of the
ASSOCIATION OF AMERICAN MEDICAL COLLEGES

Opinion Survey on MCAT Revision

AAMC is planning a major revision and expansion of the present admissions testing program. We are seeking responses from as many constituents as possible to provide insight into the nature of admissions information considered essential for fair treatment of all candidates, and to give admissions committees optimum types of selection criteria. Your rating of the following possibilities, along with any additional suggestions you may have, will be deeply appreciated.

Two types of ratings will be used in answering the questions. First, at the left of the items a blank space has been provided for you to rank each item within a category according to your own personal order of priority. Use the number "1" as your highest priority, and then "2," "3," and so on for the balance of the items within the category. After ranking the alternatives, then rate each alternative according to the scale below by circling the letter representing your rating.

Response Definitions: A. Very Important
B. Important
C. Unimportant
D. Very Unimportant
N.O. No Opinion

CONSIDERATIONS FOR AN ADMISSIONS ASSESSMENT PROGRAM

1. Rank and rate each of the following in importance as sources of information about medical school applicants.

N	Mean		N	Mean	A	B	C	D	N.O.
21	3.1	a. Biographical information from application blank	27	1.8	33%	56%	11%	0%	0%
21	1.7	b. College GPA (transcript information)	27	1.3	70	30	0	0	0
21	4.7	c. Letters of recommendation	26	2.1	19	58	15	8	0
15	5.6	d. Locally constructed examination of applicant abilities	26	3.6	4	8	46	12	30
21	2.6	e. National examination of applicant abilities	27	1.6	48	44	7	0	0
20	3.6	f. Personal interviews	25	1.8	48	40	4	4	4
2	3.0	g. _____	2	2.5	0	50	50	0	0

2. Rank and rate the importance of the following as performance criteria which should ideally be predicted by an assessment program for the field of medicine.

A. PERFORMANCE IN MEDICAL EDUCATION

21	2.5	a. In medical school basic sciences	26	1.7	39	54	4	4	0
21	1.9	b. In medical school clinical sciences	26	1.3	69	31	0	0	0
21	3.6	c. On National Board Medical Examinations	26	2.3	0	73	27	0	0
21	2.0	d. As criterion during internship/residency	25	1.4	60	40	0	0	0
0	0	e. _____	1	1.0	100	0	0	0	0

B. PERFORMANCE IN THE MEDICAL PROFESSION

21	1.1	a. As practitioners	27	1.2	82	19	0	0	0
15	3.0	b. As medical educators	25	2.3	12	60	20	4	4
15	2.7	c. As medical researchers	27	2.3	11	59	26	0	4
21	2.5	d. As managers of health care delivery	24	2.3	21	54	8	8	8
0	0	e. _____	2	3.0	50	0	0	0	50

3. Which of the following areas of a candidate's academic achievement are most important for admissions committees to know?

	N	Mean	A	B	C	D	N.O.
21 3.7 ___ a. Behavioral and social sciences	27	1.9	30	59	7	4	0
21 5.1 ___ b. General humanities	27	2.0	19	59	22	0	0
21 3.2 ___ c. Quantitative skills	26	1.8	35	58	4	4	0
21 3.0 ___ d. Science survey	26	1.7	46	42	8	4	0
20 2.7 ___ e. Science-specific subject areas	27	1.6	52	33	15	0	0
21 3.1 ___ f. Verbal skills	27	1.5	56	37	7	0	0
0 0 ___ g. _____	3	2.0	0	100	0	0	0
0 0 ___ h. _____	0	0	0	0	0	0	0

4. Place a checkmark beside the corresponding letter of any areas listed in question 3 which you feel should be tested but now are not regularly tested by the present MCAT.

(21) 14 a. 8 b. 0 c. 1 d. 6 e. 2 f. (Frequency)

5. Within each of the general academic areas named in question 3, which are the most important subtopics for admissions decisions?

BEHAVIORAL AND SOCIAL SCIENCES

N	Mean									
21	3.0	___ a.	Anthropology	26	2.3	12	58	23	8	0
21	3.5	___ b.	Economics	26	2.5	4	42	54	0	0
21	1.5	___ c.	Psychology	26	1.5	46	54	0	0	0
21	2.0	___ d.	Sociology	25	1.7	40	56	0	4	0
0	0	___ e.	_____	2	1.5	50	50	0	0	0

GENERAL HUMANITIES

21	2.2	___ a.	Arts and literature	26	2.3	8	65	23	0	4
21	2.3	___ b.	History	26	2.4	12	54	27	0	8
21	1.5	___ c.	Philosophy	26	2.1	31	35	31	0	4
0	.0	___ d.	_____	2	3.0	0	0	100	0	0

QUANTITATIVE SKILLS

19	2.8	___ a.	Algebra	25	1.8	36	44	20	0	0
19	3.0	___ b.	Arithmetic computation	23	1.8	44	35	17	4	0
18	3.6	___ c.	Calculus	25	2.4	16	44	32	4	4
18	4.2	___ d.	Geometry	25	2.7	8	28	52	8	4
20	1.2	___ e.	Quantitative reasoning	25	1.5	64	32	0	0	4
0	0	___ f.	_____	1	1.1	100	0	0	0	0

SCIENCE

18	7.0	___ a.	Biochemistry	25	2.1	24	48	20	8	0
20	2.4	___ b.	Biology	25	1.3	76	20	0	4	0
19	4.7	___ c.	Cell biology	26	1.7	35	58	8	0	0
20	3.1	___ d.	Chemistry	26	1.5	58	35	4	4	0
18	6.1	___ e.	Elementary general science principles	24	2.1	42	13	42	0	4
17	6.8	___ f.	Genetics	25	2.2	8	72	16	4	0
19	4.3	___ g.	Interpretation of scientific experiments	25	1.7	36	60	4	0	0
20	5.4	___ h.	Physics	26	1.9	35	50	8	4	4
1	6.8	___ i.	Physiology	25	2.0	28	48	20	4	0
1	6.6	___ j.	Zoology	26	2.0	35	39	23	4	0
0	0	___ k.	_____	0	0	0	0	0	0	0

(Continued)

5. (Continued)

N		Mean	GENERAL SKILLS						
			N	Mean	A	B	C	D	N.O.
21	1.2	a. Reading comprehension	27	1.2	85	15	0	0	0
20	2.9	b. Verbal analogies	27	1.6	44	48	7	0	0
21	2.5	c. Vocabulary	27	1.5	56	41	4	0	0
21	3.3	d. Writing or composition	26	1.7	46	42	8	4	0
0	0	e. _____	1	1.0	100	0	0	0	0

6. Ideally, what other areas should admissions assessment programs evaluate?

21	2.1	a. Ability to logically analyze and synthesize	27	1.3	70	30	0	0	0
21	4.6	b. Career orientation	26	2.0	19	62	19	0	0
21	2.4	c. Effective human relations	27	1.3	70	26	4	0	0
20	2.2	d. Motivation	27	1.3	85	11	0	0	4
21	3.6	e. Self-image	27	1.6	56	33	11	0	0
0	0	f. _____	1	2.0	0	100	0	0	0

GENERAL OBSERVATIONS

7. Which are the most desirable personal attributes you have observed in medical students?

21	3.9	a. Disposition for scientific pursuits	26	2.0	19	69	8	4	0
21	3.9	b. Leadership ability	25	2.3	12	52	32	4	0
21	1.8	c. Maturity	27	1.3	74	26	0	0	0
21	2.1	d. Self-discipline	27	1.3	74	26	0	0	0
21	3.1	e. Social concerns	27	1.6	48	40	11	0	0
0	0	f. _____	2	1.0	100	0	0	0	0

8. Which of the following admissions actions would have the greatest positive effect on the quality of health care in this country?

20	2.4	a. Detecting students with realistic views of the demands and responsibilities of a medical career	26	1.6	46	46	8	0	0
20	4.3	b. Providing more student financial support	23	2.3	9	61	26	0	4
19	3.2	c. Showing more sensitivity to cultural differences in evaluating applicants	25	2.0	16	68	12	4	0
19	1.7	d. Having more concern with nonintellective factors when selecting applicants	25	1.7	44	44	8	4	0
19	3.2	e. Selecting students from more heterogeneous backgrounds	25	2.1	16	72	0	12	0
0	0	f. _____	1	1.0	100	0	0	0	0

9. Which of the following would most assist good admissions work?

19	3.4	a. Audiovisual or other technological aids depicting admissions core services	26	2.7	8	38	35	11	8
21	2.5	b. Manuals and handbooks describing Assessment Program	26	2.3	15	58	19	0	8
20	2.3	c. Students having self-assessment and career counseling aids	26	1.9	31	54	15	0	0
1.8	d. Workshops and in-service programs formulated to deal with the admissions process	26	1.7	50	39	4	8	0	
1	1.0	e. _____	2	1.0	100	0	0	0	0

10. In the table below, estimate the percentage of your presently enrolled students who belong to each of the groups listed.

	Percent Enrollment
Women	_____
Blacks	_____
Chicanos	_____
American Indians	_____
_____	_____

11. In the table below, indicate whether or not your school is actively seeking more students from the groups listed.

	Seeking More?		N	Mean
Women	Y 81%	N 19%	21	1.2
Blacks	Y 100	N 0	26	1.0
Chicanos	Y 46	N 54	22	1.6
American Indians	Y 55	N 45	20	1.5
_____	Y 0	N 0	0	0



A POSITION PAPER PRESENTING RECOMMENDATIONS FOR
DEVELOPMENT OF AN ADMISSIONS ASSESSMENT PROGRAM
FOR MEDICAL COLLEGES

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Association of American Medical Colleges
Southern Regional Conference
Atlanta, Georgia
July 9-10, 1973



A. There is general agreement among the members of the Southern Region OSR that a revised admission program is needed. The membership of the Southern Region OSR support the MCAT revision and expansion of admissions assessment services.

B. Recommendations for development of measures of cognitive behavior.

1. General aptitude should be measured.

2. Ability to evaluate quantitative data and make decisions with these evaluations should be examined.

3. General information testing should consist of questions that are socially and culturally homogeneous.

4. Reading comprehension should be used in adjunct to verbal examination. Verbal analogies and written composition should also be measured.

C. Recommendations for necessary publications, audiovisual materials, workshops, or other services and resources that will support any admissions assessment program to be developed.

Manuals and handbooks describing the assessment programs, self-assessment, and career counseling aids would be very useful to undergraduate students contemplating application to medical school. Workshops and in-service programs would also be useful in helping undergraduate students and pre-med advisors become familiar with the admissions process.

D. Recommendation for non-cognitive elements in an assessment program.

The evaluation of applicants in areas such as human relations, motivation, emotional stability, stability under stress and ability to logically analyze and synthesize should be attempted. Per-

haps a method of evaluation along the lines of psychological testing could be developed. This area of evaluation should have very high priority and be very carefully and extensively researched. The majority of errors made by medical schools in evaluating applicants are in the non-cognitive characteristics of applicants.

E. Conclusions

The MCAAP should provide medical schools with a means to evaluate applicants to medical schools that is far superior to the present MCAT. The assessment program should emphasize evaluation of an applicant's aptitude, ability to comprehend, ability to analyze and general information in the variety of topics deemed necessary for admission to medical school. Special emphasis should be placed in determining if an applicant possesses the non-cognitive elements essential to becoming a good physician.

A POSITION PAPER REPRESENTING SOME THOUGHTS
AND RECOMMENDATIONS CONCERNING THE ADMISSIONS
ASSESSMENT PROGRAM FOR MEDICAL COLLEGES

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Southern Regional Conference
Atlanta, Georgia
July 9-10, 1973



Recommendations from SAAHP indicating the level of support for development of a comprehensive assessment program:

The admissions crisis in medical education has affected every level. The advisors feel the crunch at the pre-professional level where we probably talk with even greater numbers than ever apply to medical school. The advice we give to the freshman and sophomores has a great bearing on what they do during their junior and senior years.

Anything that will improve the information for students so that they may better assess their possibilities in a medical school is wholeheartedly endorsed by the advisors from the south-east. We feel that continued intensive communications between medical school admissions committees and advisors is essential. This must be a two-way dialogue with the admissions boards and continuing to accept advice from advisors concerning revisions of standards as well as informing advisors of the changing criteria which they intend to apply.

Recommendations for development of measures of cognitive behavior

Before discussing the development of cognitive behavior for measuring success in medical school, we should like to stress several items of vital importance. The advisors would like MCAAP to define the following:

1. Exactly what cognitive behavior are we testing for?
2. For what purpose do we want this information?
3. Given the possibility of measuring this behavior, we must not view these exams as absolutes. Or do we?

Admittedly MCAAP is the group that is to give the focus of any new testing process, procedure or program. However, what

must be clear to every task force member is what exactly is it we really wish to test for in this section. Is it intelligence? Is it the power to remember facts? Is it the ability to "problem-solve?"

Next, the task force committee must understand the kind of predictor we are seeking. Is it really survival through the basic sciences? Through biochemistry, etc.? Through the first year? Through the clinical years? Through medical school? Or do we want to be able to predict who the successful practitioner will be?

Finally, whatever is chosen under point two above, we must then admit that no testing device will be all inclusive. In the past, MCAT has been used wrongly to keep minorities out of school, and any instrument we now come up with can be used equally well for a similar purpose. We want a valid test, but the advisors are not interested in seeing another "predictor" used as an absolute. We need to admit the fundamental falacy of the concept that any written test of a generalized nature, however carefully constructed, will always be a meaningful index of performance capabilities. Some students, and this is especially true of those from the type of educational background that has typified minority group opportunities, simply do not perform well in the examination situation.

The Medical School Admissions Requirement handbook gives minimum requirements for all medical schools as: one year each biology, physics, math and English and two years of chemistry (including organic). If, indeed, these do represent the minimum, then any cognitive test must test only these areas.

It would be the grossest dishonesty to test on calculus or biochemistry if these were not also stated to be part of the minimum requirements. Whereas we feel we should advise students towards what is expected of them on the exam, the exam and minimal course content should not vary that much.

This may sound too much like "the lowest common denominator," but isn't that what MCAT is all about?

It has been a common cry of medical educators that today's students cannot read. While sad, it is very true. And while we may deplore the situation, it is a situation which cannot be overlooked. Regardless of whose fault it is, is there a need for a cognitive test in reading? And if so, do we wish to measure speed? Or comprehension? or both? A word of warning! Nothing is more subject to cultural and racial bias than are reading exams. For not only are words subject to different meanings, but also these divergent meanings will cause an apparent lack of reading skill and speed when confusions exist.

This warning is also true when we apply the MCAT scores in recent years. The scores for the entire student pool that were rejected from medical schools were all higher than the scores for all minority students who were accepted to medical schools. It is obvious that there are other factors operating here.

Several advisors have some specific comments which may be useful simply to quote at this time. "Are the quantitative and general information scores really helpful predictors of success in medical school? Can the MCAT scores make sharper distinctions between the qualified and the best qualified?" AND "Nowhere in the entire mechanism process...is there a mechanism to determine

whether the applicant has the ability to draw valid conclusions from stated facts."

Recommendations for services or resources that will support any admissions assessment program to be developed

Whatever method of publicity used to make the pre-professional community aware of any changes forthcoming we must admit to no one best way. There are several good ones and they are all expensive.

The best of the good ones is a face-to-face dissemination of information between advisors and students and the medical college. Individual meetings are impossible. The organization of regional or sub-regional conferences which last at least three days would be the next best thing. Any less than this would not accomplish anything more than the written word. The advisors and/or students must get to know the medical school and/or AAMC if meaningful information is to be transferred.

A well-written presentation is also needed as a follow-up of the conferences and for any who could not attend. At the risk of killing off too many trees, I believe it ought to be a lengthy and complete document including reasoning and supporting evidence. It should be as large as the MSAR and for its first edition nothing should be left out. One occasionally should be able to refer to a 'bible.'

If expense is no object, films, film strips, cassettes, etc., could be prepared. But if these audiovisuals are used we suggest two audiences - the pre-med student and his advisor. Unless, unusually well prepared these aids date themselves very quickly and are of little use in a few years. However, they do carry initial impact and are worthwhile for stimulating enthusiasm and

interest.

Whatever method is used one thing must be kept in mind - the dissemination of honest information. (See questionnaire results. Some advisors do not feel they are told the truth by the medical schools.) If the medical schools expect full cooperation of the advisors about their students, it should be a mutual cooperation. Too often there is a paternalistic feeling for the advisor. This attitude is belittling and only causes strife. Many times it is only because of our genuine concern for our students that we advisors tolerate these feelings. Real or imagined, they exist, and the medical school must take into consideration the tremendous help an advisor can be. In return the professional school should reciprocate and aid the advisor in every way necessary.

A word about minority applicants and their advisors. In the immediate future the pool of minority applicants will probably not increase - either in numbers or in quality. Given this fact, the medical school must adjust its programs, attitudes, services, etc., if it is genuinely concerned with attracting and then graduating minority doctors. Consequently, MCAAP must grapple with this matter in a very real way.

The medical schools and MCAAP may not agree with the next thesis, but it is sincerely felt by the advisors of the region. For those students who do not get admitted to medical school, it is still the responsibility of the medical school to see that the student is helped to stay in the health professions if this is his real desire.

Although set up along AAMC regional lines and initially started with AAMC help the names of our organizations are the

Association of Advisors in the Health Professions. That emphasis on all the health professions as opposed to only the medical profession is not simply rhetorical. Fully two-thirds of the students who apply to medical schools will not make it into medical school. What then? Often the advisor is also at a loss. (This loss was expressed in the questionnaires and was the subject of many private communications to the regional representative in preparing this paper.) The AAMC should be concerned with the alternative in more than a passing way. For if there are not enough nurses, X-ray technicians, physical therapists, or hospital administrators around, the doctor will not be able to deliver adequate health care. Perhaps the whole idea of the HMO would come into play here. Were students to realize how important these fields were, they might be more willing to pursue them - even as a first choice.

Recommendations for non-cognitive elements in an assessment program.

At the outset of this section the advisors would like to make clear that we have called for more emphasis on this area all along. Some of us gathered at meetings have, in fact, sounded like broken records in our call for revision of the non-cognitive aspects of medical school entrance criteria.

Our efforts have been directed mainly to three areas:

1. More weight and attention given by medical schools to evaluations of students offered by their pre-med advisors and instructors.
2. A joint development of a standard form for recommendations (evaluations) to be used by all medical colleges.

3. MCAT revision to include non-cognitive areas.

In the questionnaire given to advisors, the cognitive measures were not slighted in advisory evaluation of students. (Though this may be attributable to the fact that advisors were aware that these indices would have great weight with medical college admissions boards.)

However, a significant number (15 out of 38 respondents) listed non-cognitive measures such as motivation, family background, etc., as their first choice of "most valuable information about students." Further, considering the overall responses, approximately 60% of responses for "valuable information," first through fourth choices, were in the non-cognitive areas. Of individual non-cognitive factors, motivation was a major evaluative factor for 50% of the advisors.

On the basis of the above viewpoints, it would seem that advisors and advisory boards could give a reasonably balanced view of the student. The medical college admissions boards need to recognize explicitly that there is no source of information about the student which can supplant this, and acknowledge their need for adequate advisory feedback as well as to provide necessary guidelines for advisors and standardized recommendations forms to facilitate the feedback.

One serious reservation needs to be stated with respect to non-cognitive testing to be conducted simultaneously with cognitive aspects of the MCAT. By their very nature, these "personality tests" are not exams which can be "studied for." Nor should the student, necessarily, approach them at the same time or in the same state of mind as he does the informational type of exam.

It would seem logical, in fact, that any personality or psychological evaluation which would be predictive of a student's success in medical school would be equally valid whether administered during his freshman or senior year of college.

In view of this, we would urge that these tests be conducted separately from the information MCAT's. Furthermore, it might be very helpful if a system were devised whereby each student could receive the psychological tests as early as possible, and feedback be provided to his advisors which would enable them to encourage or discourage his ambitions for a medical career on the basis of his results on these exams.

As with the informational test, the psychological test may also provide a great temptation to and opportunity for discriminatory practice. Certain psychological indices for "success" and "survival" have been perforce developed by minority groups which might not be acceptable "norms" to the current "establishment," which will, of course, be devising these psychological tests and administering and evaluating them. It perhaps should not need to be said, but we will say it none-the-less: no psychological testing system which neglects massive input from the minority groups themselves would be either acceptable or valid to the advisors of minority students.

Summary recommendations:

1. Enhancement of communications of all types between medical college admissions boards and pre-med advisors.
2. A clear concept of what the purpose of testing in cognitive areas really is, with genuine correlation between material tested and stated pre-med curricular requirements.

3. Elimination of cultural or racial bias, especially in 'reading' portions of the tests.

4. An initial, thorough presentation of any revisions in admissions assessment programs, including necessary meetings with advisory groups.

5. A public-relations effort to establish better rapport and deep mutual respect between advisors and medical college admissions boards, specifically including dissemination of honest information by the latter.

6. More involvement and assistance by medical schools in sparking interest and assisting student placement in other health professions.

7. Inclusion of more meaningful non-cognitive evaluation, but not in such a fashion that it will prove merely another means of eliminating minority applicants.



M C A A P
WESTERN REGION
POSITION PAPERS

Council of Deans

Group on Student Affairs

Group on Medical Education

Organization of Student Representatives

Association of Advisors to the Health
Professions



POSITION PAPER WITH RECOMMENDATIONS
FOR DEVELOPMENT OF AN ADMISSIONS
ASSESSMENT PROGRAM FOR MEDICAL COLLEGES

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Association of American Medical Colleges
Western Regional Conference
Los Angeles, California
July 16-17, 1973



Following is a summary report organized from results of a questionnaire sent to the Western Council of Deans. Of 18 questionnaires mailed, ten were returned and the following is the composite information. The report of responses is presented below in the order in which questions appeared on the questionnaire.

Item 1: Rank and rate each of the following in importance as sources of information about medical school applicants.

- a. Biographical information from application blank
- b. College GPA (transcript information)
- c. Letters of recommendation
- d. Locally constructed examination of applicant abilities
- e. National examination of applicant abilities
- f. Personal interviews
- g. _____

Grade point average was considered the most important source of information. This was followed in order by a nationally administered examination and the personal interview. Letters of recommendation were next, followed by biographical information and local examinations, for which there was little support.

Item 2A: Rank and rate the importance of the following as performance criteria which should ideally be predicted by an assessment program for the field of medicine.

- A. Performance in Medical Education
 - a. In medical school basic sciences
 - b. In medical school clinical sciences
 - c. On National Board Medical Examinations
 - d. As clinician during internship/residency

Performance in medical education was equally divided between the basic sciences and clinical sciences. In general, there was strong feeling for these. A few expressed strong feelings regarding performance as a clinician during internship and residency.

B. Performance in the Medical Profession

- a. As practitioners
- b. As medical educators
- c. As medical researchers
- d. As managers of health care delivery
- e. _____

Performance in the medical profession; strong feeling by all respondents was as practitioners and the remaining items with the exception of researchers were essentially equal and in second place.

Item 3: Which of the following areas of a candidate's academic achievement are most important for admissions committees to know?

- a. Behavioral and social sciences
- b. General humanities
- c. Quantitative skills
- d. Science-survey
- e. Science-specific subject areas
- f. Verbal skills
- g. _____
- h. _____

All agreed and essentially equal that science, both survey and specifics of subject areas are extremely important. Quantitative skills would be next in rank and then essentially equal were general humanities and behavioral sciences. Verbal skills were

listed as very important and although difficult to numerically rank, it seems to fall somewhere between one and two. The general feeling regarding this entire question is that they are all important and they should be tested for.

Item 4: Place a checkmark beside the corresponding letter of any areas listed in Question 3 which you feel should be tested but now are inadequately tested by the present MCAT.

a. b. c. d. e. f.

Essentially all agreed that the behavioral and social sciences are inadequately tested by the present MCAT and comments stated that they should be covered.

Item 5: Within each of the general academic areas named in Question 3, which are the most important subtopics for admissions decisions?

Behavioral and Social Sciences

- a. Anthropology
- b. Economics
- c. Psychology
- d. Sociology
- e. _____

Quantitative Skills

- a. Algebra
- b. Arithmetic computation
- c. Calculus
- d. Geometry
- e. Quantitative reasoning
- f. _____

General Humanities

- a. Arts and literature
- b. History
- c. Philosophy
- d. _____

Science

- a. Biochemistry
- b. Arithmetic computation
- c. Cell Biology
- d. Chemistry
- e. Elementary general science principles
- f. Genetics

-

Verbal Skills

- a. Reading comprehension
- b. Verbal Analogies
- c. Vocabulary
- d. Writing or composition
- e. _____

- g. Interpretation of scientific experiments
- h. Physics
- i. Physiology
- j. Zoology
- k. _____

Psychology and sociology are strongly in the lead. In a few cases, anthropology would come in as a weak third with very little interest demonstrated for economics. In general, humanities and history was the unanimous choice followed by arts, literature, and philosophy. For quantitative skills, algebra and quantitative reasoning were essentially equal as being the most important.

There was mixed feeling regarding all of the other items listed. Under science, biology, cell biology, and biochemistry were considered to be extremely important and, in several instances it was noted that these areas as a matter of course should include elementary general science principles and the ability to interpret scientific experiments.

It is difficult to rank all of the other subjects as there was wide variation on what was considered to be most important. I think in summation for this one section, it is safe to say the general feeling is modern day "molecular biology", a broad term to encompass all the basic principles is what is considered to be important. It is interesting to note that physics was long trailing. In one instance, a comment was made that this again should be modern physics and should be mixed in to include quant, physics, optics and the atomic sciences.

In the case of verbal skills, reading comprehension, writing

or composition and vocabulary were considered essentially equal and of extreme importance. In reading and attempting to weigh all the responses, again, it would appear that the comprehension aspect would be considered to be extremely important.

Item 6: Ideally, what other areas should admissions assessment programs evaluate?

- a. Ability to logically analyze and synthesize
- b. Career orientation
- c. Effective human relations
- d. Motivation
- e. Self-image
- f. _____

Rankings for this item placed motivation and the ability to analyze and synthesize far ahead, with a strong recommendation that problem solving is of extreme importance. Effective human relations and self image were pretty much together. This was followed by career orientation. Here again in summary, the evaluation of motivation and the ability to problem solve were most important.

Item 7: Which are the most desirable personal attributes you have observed in medical students?

- a. Disposition for scientific pursuits
- b. Leadership ability
- c. Maturity
- d. Self-discipline
- e. Social concerns
- f. _____

Indicate unanimous agreement that maturity, self discipline and social concerns are the most desirable attributes people have observed.

Item 8: Which of the following admissions actions would have the greatest positive effect on the quality of health care in this country?

- a. Detecting students with realistic views of the demands and responsibilities of a medical career.
- b. Providing more student financial support
- c. Showing more sensitivity to cultural differences in evaluating applicants
- d. Having more concern with nonintellective factors when selecting applicants
- e. Selecting students from more heterogeneous backgrounds

There seemed to be an equal split between detecting students with realistic views of the demands and responsibilities of a medical career and having more concern with non-intellective factors when selecting applicants. A side comment again is that in some instances, all were considered to be extremely important providing they could be reliably and validly assessed. Financial support crops up and is an important factor.

The remaining questions are not fully summarized at this point in time. It is only pointed out that in regard to item 9, workshops were considered to be the most important way of assisting good admissions work and recruitment is pretty much standard at each institution.

In summary, this survey came up with similar results to those discussed at the Santa Monica meeting from all the other groups. The concept of problem solving ability, measurement of motivation, and the ability to assess non-cognitive areas clearly stand out as being of prime importance.

A POSITION PAPER PRESENTING RECOMMENDATIONS FOR
DEVELOPMENT OF AN ADMISSIONS ASSESSMENT PROGRAM
FOR MEDICAL COLLEGES

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July 16-17, 1973



A. Recommendation From the Western Group on Student Affairs Indicating Its Support for Development of Comprehensive Admissions Assessment Program.

The Western Group on Student Affairs (GSA) has expressed itself in favor of the development and eventual implementation of reasonable and orderly revisions and an expansion of the Medical College Admission Test (MCAT), and of the augmentation of admissions assessment procedures. This expression of support is tempered with some caution: To wit, and however the MCAT is revised, it will in all likelihood not accomplish all the goals nor overcome the concerns which have motivated the Association of American Medical Colleges (AAMC) to explore new mechanisms for the making of admissions decisions, and which might address some of society's concerns about health care delivery.

The constituency realizes that the MCAT, in its present form, possesses limited value for predicting physician performance. Performance on the test seems to be a more useful measure of ability to cope in a demanding educational system. Group discussions at regional and national meetings have been devoted to the complexities of admissions and to a growing awareness of the fallibility of the interview. (1) A widely-held belief has emerged - based on the articulated opinions of vocal admissions offices - that the format in which medical education occurs exerts greater influence on the future physician than the academic and non-cognitive characteristics possessed by the student upon entering medical school. (2) This opinion is not shared by all concerned, and an assessment program is required to clarify this fundamental and far reaching issue.

Members of the Western GSA deal continually with emotional and academic problems among promising students. These students cannot yet be identified prospectively on the basis of pre-admission cognitive variables. More often, their attitudes toward fellow students, medical school and life goals seem to be the decisive determinants of problems. Their occurrence in promising students have suggested to several members of the Western GSA that a proposed expansion of admissions assessment procedures should emphasize measures of non-cognitive attributes. Suggestions abound in the literature to the effect that some students with potential problems may be identified early in their medical education on the basis of evaluation of their non-cognitive attributes. (3) A logical extension of these suggestions - and of the findings on which they are based - is development of pre-admission non-cognitive assessment procedures.

A general consensus appears to the effect it is more important to identify and select a better potential physician than to admit the potentially best student. Therefore, we require validated indices extending beyond our present analysis of academic potential and impinging upon the cognitive and non-cognitive variables which characterize and may predict the "good physician". For the present, the group has recognized the impossibility of using criteria of physician performance as predictors in the medical school admissions process, for such criteria are not yet generally accepted as applicable to all physicians, nor are the studies themselves readily adaptable to such preferred uses. The situation is not entirely hopeless, however, since a study at the student clerkship level has shown that good physical examination

skills were best related to good interpersonal behavior, and - to a lesser extent to good communication skills.(4)

B. Recommendations for Development of Measures of Cognitive Behavior

The opinion survey forms concerning MCAT revisions provided by the MCAAP were received from 22 individuals representing the Western GSA and admission committees of the associated medical schools. A major concern expressed by constituents was to the effect that the responses were too rigidly directed. This criticism notwithstanding, many respondents included their own opinions.

A summary of the opinion survey priorities appears on page 8, and the individual items are summarized in table and histogram format on pages 10 through 24.

The tabulated results yielded the following ranking of performance criteria to be utilized in the selection of candidates for medicine. Predictably, the highest ranking criterion was to select practitioners who would locate where health care needs exist. Successful performance in medical school basic sciences courses was rated slightly but not significantly ahead of successful performance in the clinical disciplines. The divergent emphasis of the diverse medical schools was clearly demonstrated as the responses on these two topics were bimodal. Evidently, some schools emphasize the pre-clinical sciences, whereas others focus on the clinical disciplines. Successful performance as a clinician during internship ranked next, followed by successful performance as medical educators and/or researchers, which in turn was equally ranked with successful performance on National Board Examinations.

Among the predictor variables selected from candidates' past academic achievement, respondents indicated that science by subject area clearly ranked in first place, followed by verbal and quantitative skills. Additional comments by respondents focused on: problem identification, problem solving, reading comprehension, and general information. Although general information was ranked last among these write-in predictors, almost 20% of the respondents wrote it in. Thus, general information as a predictor variable earned a rather high frequency of occurrence, although it was not generally ranked as high as the other three suggested predictors.

Science achievement was clearly considered the highest ranked predictor. An analysis of question 3 by subject area indicates the following rank order of subject (pp. 14-15): Biology, Cell Biology, Chemistry, Biochemistry, Physiology, Genetics, and Physics, followed by the write-ins of Mathematics, Zoology, and (finally) Embryology.

C. Recommendations for Necessary Publications, Audiovisual Materials, Workshops, or Other Services and Resources to Support any Admissions Assessment Program to be Developed.

As evident from the questionnaire results with these topics, members of the Western GSA believe that the admissions process would benefit primarily by providing students with self-assessment and career counseling aids. Although limited assessment aids are now available, they should be augmented because students with whom an Admissions Officer converses often believe they are exceptions to the (any) rule. Manuals and handbooks were considered to be the next most desirable forms of support services, followed

by workshops and in-service programs, and finally by audio-visual and other technological aids depicting admissions concerns and services. Many Western GSA members were very enthusiastic about the workshop held in May, 1973, and entitled Western Minority Affairs Workshop. Faculty time is extremely limited, especially for those individuals concerned with admissions; however, similar workshops would be of great value not only for an Admissions Assessment Program, but for medical school admissions in general.

D. Recommendations for Non-Cognitive Elements in an Assessment Program.

Most respondents agreed that the non-cognitive attributes of candidates and their evaluation demand the bulk of admissions committee time, consideration, discussion, and decision. Moreover, such evaluation is usually accomplished in the absence of proper procedural guidelines and almost devoid of objectivity. In the current era of enormous numbers of academically qualified applicants, assessment of non-cognitive attributes might provide the most valuable data in the entire admissions process. Instead, this aspect is the most haphazard, but must eventually receive top priority and emphasis. The need is so acute that if it is not yet possible to develop non-cognitive predictors for nationwide use, selected tests should be developed and tested in selected schools, or on a voluntary basis by any medical school.

The Western GSA questionnaire respondents selected the following rank order of skills to be sought and evaluated in a candidate (pp. 16-17): Problem solving, communication, effective human relations, analysis, and synthesis, and (ranking a distant fifth) manual dexterity.

Results of the questionnaire further indicated that several non-cognitive elements were considered important for an assessment program. From questionnaire Section B, General Observations, the following rank order of desirable attributes in candidates was tabulated (pp. 18-20): High sensitivity in inter-personal relations, disposition for scientific pursuits, willingness to work with others, intensive concern for social needs, ability to get along with faculty and students, and a predisposition for particular types of practice. In addition, the respondents indicated a strong belief to the effect that integrity, intellectual honesty, sincerity, dedication and perseverance toward high quality goals were necessary attributes. A variety of other attributes related to motivation, attitude, and maturity were also listed by the respondents.

In the opinion section on changes believed to be essential for improving the quality of health care in this country (pp. 21-22), there appeared very strong support for revised selection procedures for medical students, ranking second only to improved physician distribution, and followed by revised educational experiences by med students. Most agreed that more paramedical personnel are needed, and that they require greater recognition by the physician and patient populations.

Several respondents expressed the belief that societal needs for improved health care distribution and delivery will not be addressed effectively through modifications in the admission process, but require government incentive and/or obligatory public service programs.

Concluding Statement

The Western Group on Student Affairs has expressed general agreement on the need for a reasonable and orderly review and revision of admissions assessment materials provided by the Association of American Medical Colleges. Review of the admissions process is continuous at the local level and is desirable also at the national level. Widespread doubt was expressed that revision of admission assessment materials would address some of society's concerns for health care delivery. Government incentives and/or obligatory service programs would probably address society's need and concern more effectively. The respondents to the opinion survey identified specific areas of knowledge that candidates to medical school should possess. They suggested that future admissions assessment materials should be able to measure the application of such knowledge. The membership further identified non-cognitive dimensions which are believed to relate closely to the most desirable attributes of future physicians. They endorse the development of non-cognitive materials related to general areas of attitude, and to psychomotor and interpersonal skills. Cogent arguments were presented for continuing educational programs aimed at users of admission assessment services, and for built-in, periodic re-evaluation of admission assessment services at approximately three-year intervals.

SUMMARY OF OPINION SURVEY PRIORITIES

<u>SECTION A</u>		<u>SECTION B</u>	
<u>QUESTION</u>	<u>MEAN RANK</u>	<u>QUESTION</u>	<u>MEAN RANK</u>
1. a. Basic Sci.	3.14	1. a. Soc. Concern	3.50
b. Clin. Sci.	3.18	b. Sci. Dispo.	2.58
c. Nat. Board	4.43	c. Interpers.	1.77
d. Internship	3.30	d. Work w/others	3.45
e. Practitioner	2.82	e. Relat. w/co-work.	4.58
f. Acad. Med.	4.42	f. Type of Pract.	5.78
2. a. Verbal	2.41	3. a. Manuals	2.43
b. Quant.	2.64	b. Self-instruct.	1.70
c. Sci. Subj.	1.64	c. Workshops	2.50
f. Gen. Info.	3.25*	d. Audiovisual Aids	3.24
3. a. Biochem.	4.05		
b. Chem.	3.63		
c. Biology	1.85		
d. Cell Biol.	3.47		
e. Genetics	5.45		
f. Physics	5.63		
g. Physiol.	4.27		
4. a. Prob. Solv.	1.86		
b. Commun.	2.45		
c. Interpers. Relat.	2.50		
d. Anal. & Synth.	2.82		
e. Man. Dexterity	4.86		

*n = 4/22

RESPONSE DEFINITIONS OF THE OPINION SURVEY

The following pages contain the summary of the MCAAP opinion survey. The numerical summary of ranking and rating for each question is followed by a histogram of rank-frequency distribution and the average ranking value. Each of the items has been ranked according to priority and rated according to these response definitions:

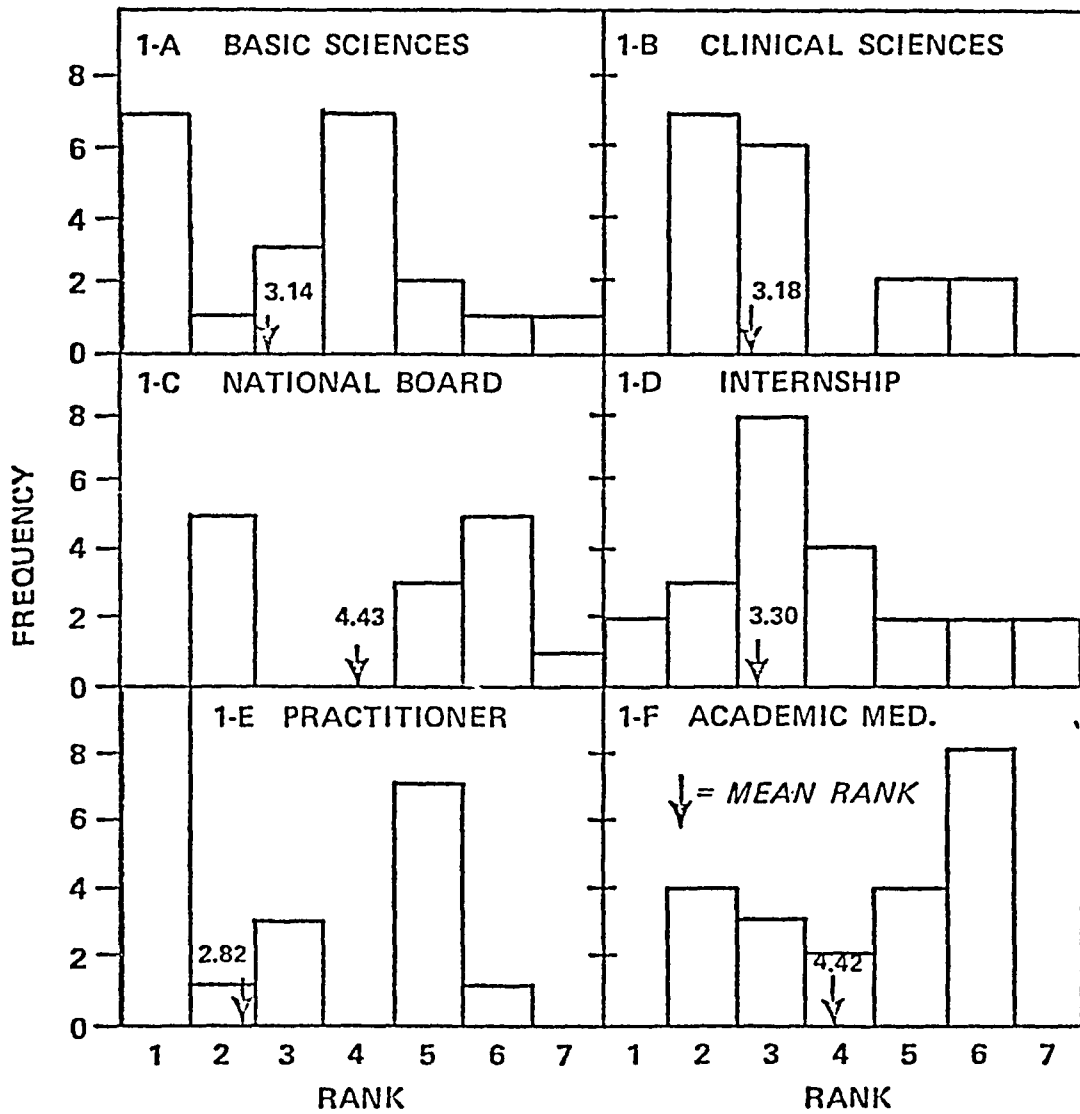
- A. Strongly Support
- B. Basically Agree
- C. Not Enthusiastic
- D. Do not Support
- N.O. No Opinion
- N.R. No Response

A. Consideration for an
Admissions Assessment Program

1. Select Candidates for Future Successful Performance (criteria):

	<u>Rank</u>							<u>Rating</u>					
	1	2	3	4	5	6	7	A	B	C	D	NO	NR
a. Medical School Basic Sciences	7	1	3	7	2	1	1	6	12	1	0	0	3
b. Medical School Clinical Sci.	0	7	6	0	2	2	0	5	8	1	0	0	3
c. National Board Medical Exams	0	5	0	0	3	5	1	3	5	5	1	0	0
d. Clinician during Internship	2	3	8	4	1	1	1	7	10	1	0	0	2
e. As Practitioners where...	10	1	3	0	7	1	0	12	6	3	0	1	0
f. As Med. Educ./ researcher	0	4	3	2	4	8	0	5	6	5	4	0	1

SECTION A QUESTION 1

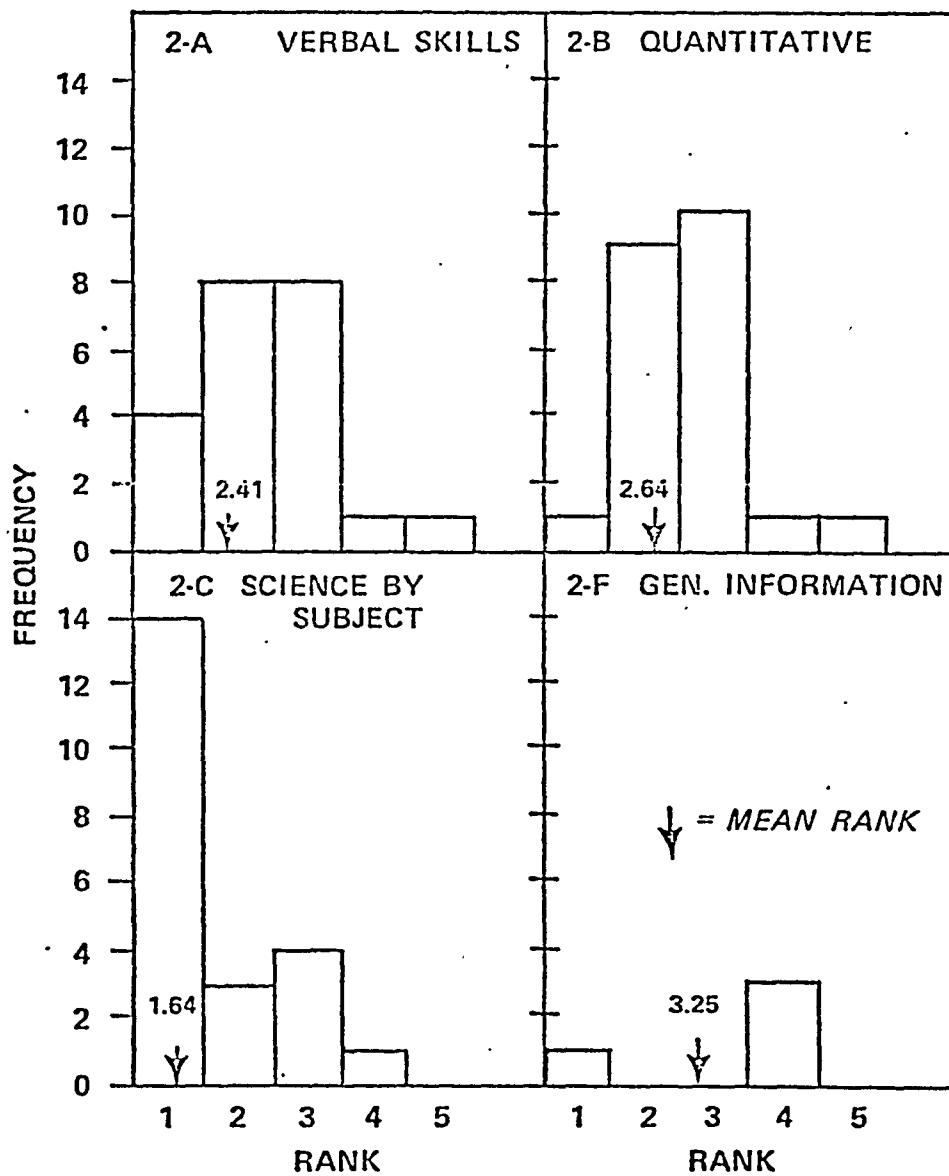


A. Consideration for an
Admissions Assessment Program

2. Admissions Committees should know about a candidate's academic achievement (Predictors) in:

	Rank					Rating					
	1	2	3	4	5	A	B	C	D	HO	NR
a. Verbal Skills	4	8	8	1	1	8	12	1	0	0	1
b. Quantitative Skills	1	9	10	1	1	12	9	1	0	0	0
c. Science by subject area	14	3	4	1	0	16	5	0	0	0	1
d. Problem identification	1	0	0	0	0	1	0	0	0	0	0
e. Problem solving	1	1	0	0	0	2	0	0	0	0	0
f. General Information	1	0	0	3	0	0	2	1	0	0	1
g. Reading Comprehension	0	1	0	0	0	1	0	0	0	0	0

SECTION A QUESTION 2

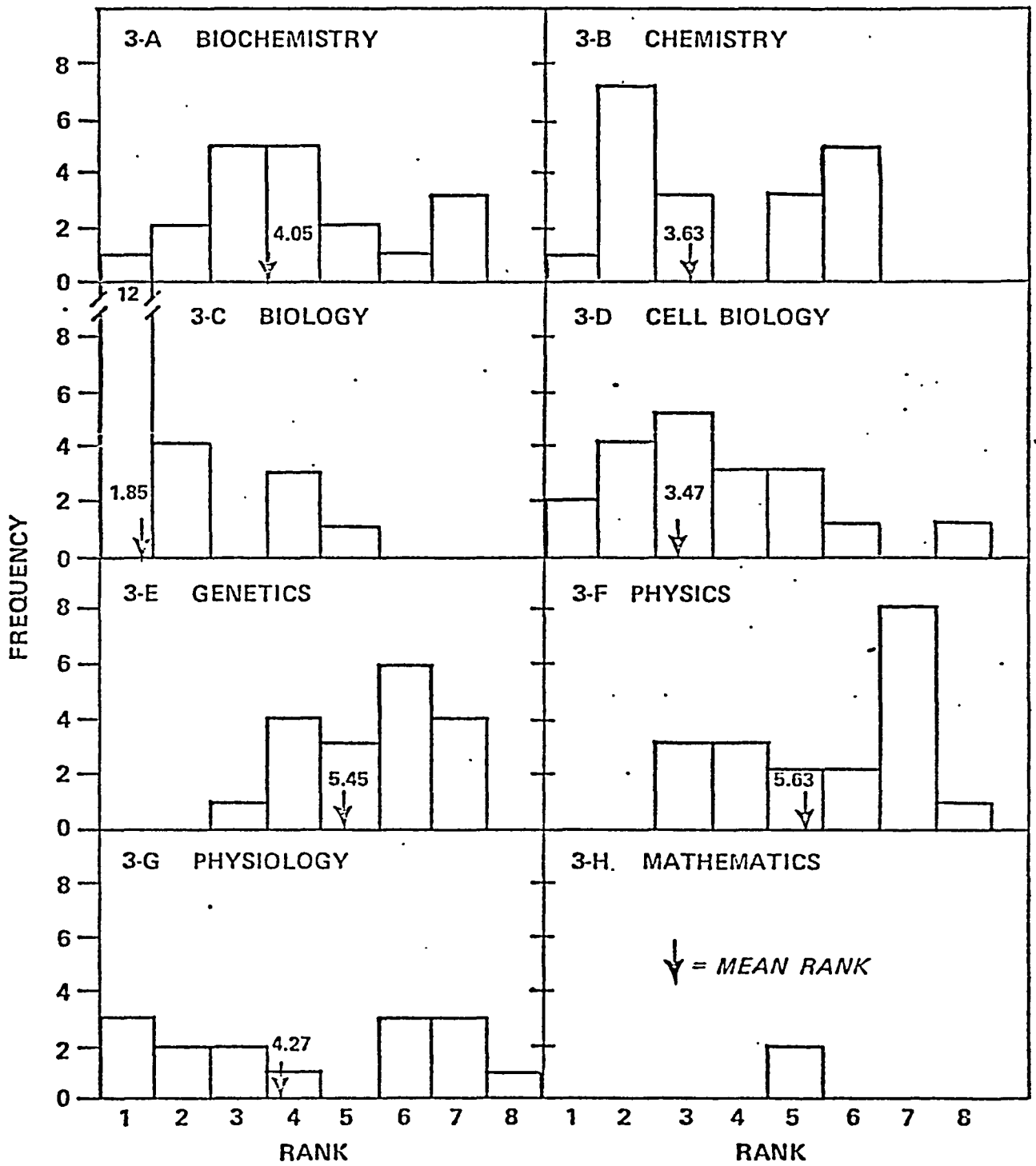


A. Consideration for an
Admissions Assessment Program

3. If you agree that science achievement should be measured by certain subject areas, then apply your rating to the areas listed.

	<u>Rank</u>								<u>Rating</u>					
	1	2	3	4	5	6	7	8	A	B	C	D	NO	NR
a. Biochemistry	1	2	5	5	2	1	3	0	5	8	4	1	1	0
b. Chemistry	1	7	3	0	3	5	0	0	7	9	3	0	0	0
c. Biology	12	4	0	3	1	0	0	0	12	7	1	0	0	0
d. Cell Biology	2	4	5	3	3	1	0	1	9	7	2	0	0	1
e. Genetics	0	0	1	4	3	6	4	0	1	12	5	0	0	0
f. Physics	0	0	3	3	2	2	8	1	4	4	9	2	0	0
g. Physiology	3	2	2	1	0	3	3	1	6	4	3	0	1	1
h. Mathematics	0	0	0	0	2	0	0	0	0	0	2	0	0	0
i. Zoology	0	0	0	0	1	0	0	0	0	1	0	0	0	0
j. Embryology	0	0	0	0	0	1	0	0	0	1	0	0	0	0

SECTION A QUESTION 3



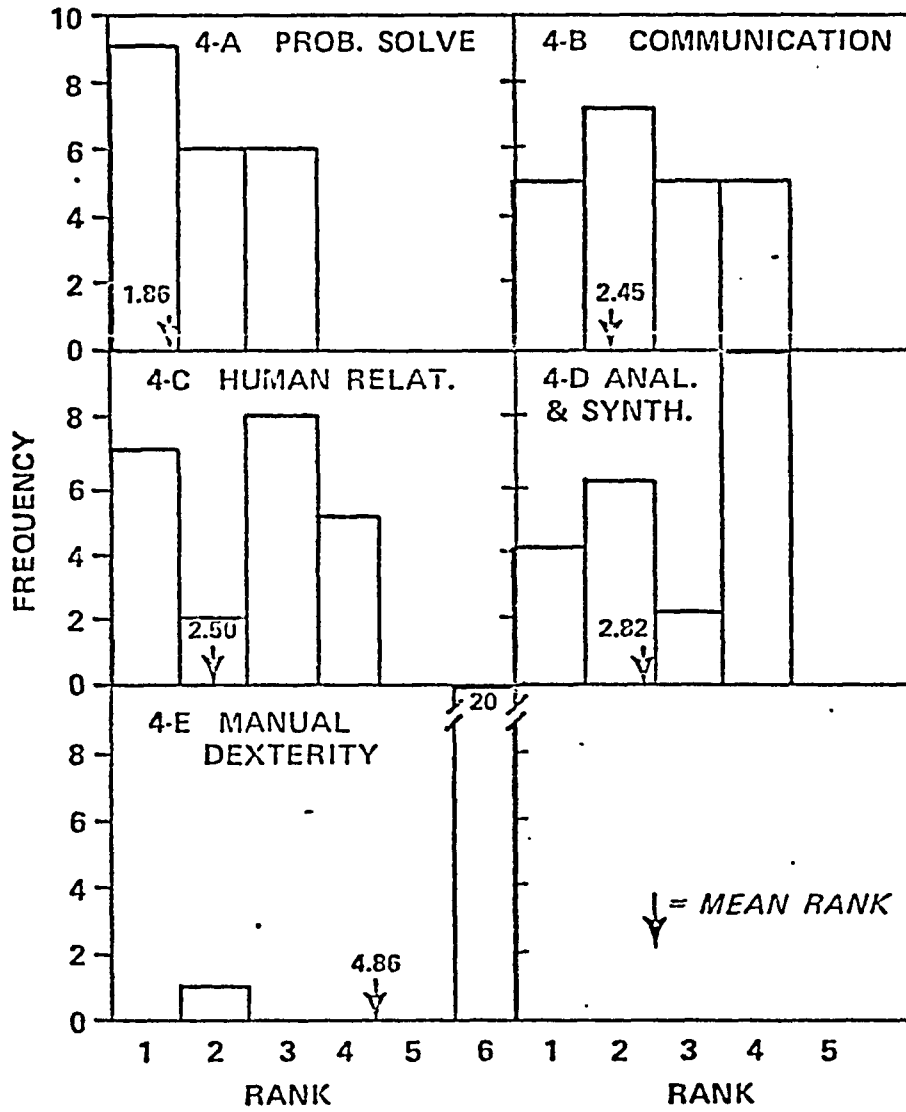
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A. Consideration for an
Admissions Assessment Program

4. Admissions assessment programs should also evaluate candidate's skills in:

	<u>Rank</u>					<u>Rating</u>					
	1	2	3	4	5	A	B	C	D	NO	NR
a. Problem solving	9	6	6	0	0	17	4	0	0	0	0
b. Communication	5	7	5	5	0	14	7	1	0	0	0
c. Effective Human relations	7	2	8	5	0	15	7	0	0	0	0
d. Analysis and synthesis	4	6	2	10	0	13	9	0	0	0	0
e. Manual Dexterity	0	1	0	0	20	0	3	10	4	4	0

SECTION A QUESTION 4



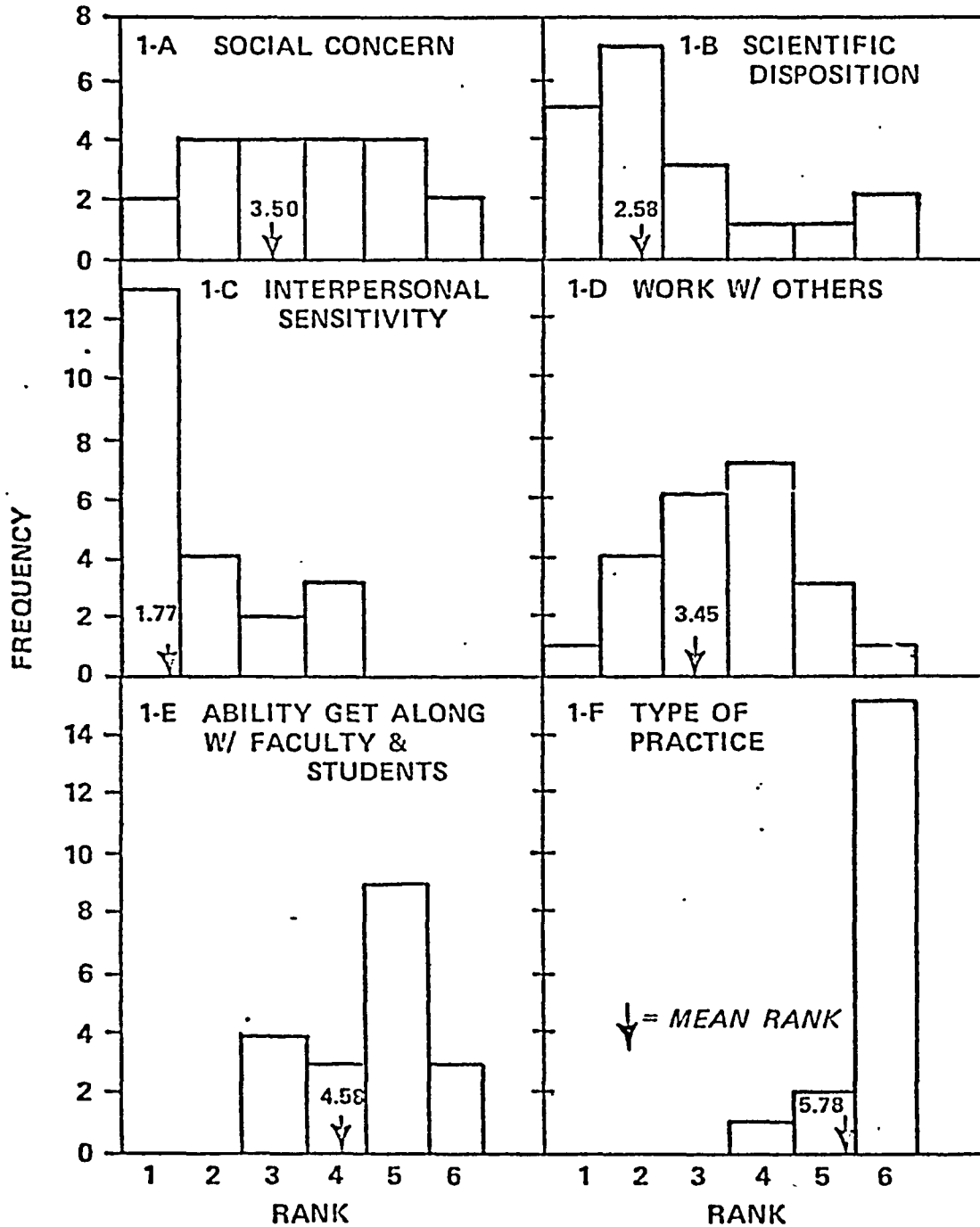
B. General Observations

1. Candidates I would consider most desirable should possess the following attributes:

	Rank						Rating					
	1	2	3	4	5	6	A	B	C	D	NO	NR
a. Intensive concern for social needs	2	4	4	4	4	2	7	12	1	0	0	0
b. Disposition for Science Pursuits	5	7	3	1	1	2	14	3	2	0	0	0
c. High sensitivity in inter-personal	13	4	2	3	0	0	12	7	1	0	0	2
d. Willingness to work w/ others	1	4	6	7	3	1	10	9	2	0	0	1
e. Ability to get along with faculty/stud'ts	0	0	4	3	9	3	5	10	3	0	0	1
f. Predisposition for certain types practice	0	0	0	1	2	15	1	2	8	6	1	0
g. Integrity	4	0	0	0	0	0	2	0	0	0	0	2
h. Intellectual honesty	2	0	0	0	0	0	1	0	0	0	0	1
i. Perseverance towards high quality goals	0	2	0	0	0	0	2	0	0	0	0	0
j. Scholarly discipline	1	0	1	0	0	0	1	0	0	0	0	1
k. Tolerance for ambiguity	0	0	0	1	0	0	1	0	0	0	0	0
l. Ability to grow (flexibility)	0	0	0	0	1	0	1	0	0	0	0	0
m. Sincerity	2	0	0	0	0	0	0	0	0	0	0	2
n. Maturity	1	0	0	0	0	0	0	0	0	0	0	1
o. Security	1	0	0	0	0	0	0	0	0	0	0	1
p. Dedication	2	0	0	0	0	0	0	0	0	0	0	2

	<u>Rank</u>						<u>Rating</u>					
	1	2	3	4	5	6	A	B	C	D	NO	NR
q. Unselfishness	1	0	0	0	0	0	0	0	0	0	0	1
r. Industry	1	0	0	0	0	0	0	0	0	0	0	1
s. Stamina	1	0	0	0	0	0	0	0	0	0	0	1
t. Tenacity	1	0	0	0	0	0	0	0	0	0	0	1
u. Judgement	1	0	0	0	0	0	0	0	0	0	0	1

SECTION B QUESTION 1



B. General Observations

2. Changes I believe to be essential in improving the quality of health care in this country:

	Rank				Rating		
	1	2	3	4	A	B	NR
Physicians who look at the total patient	1				1		
Selection and graduation of physicians who meet society's medical needs		1			1		
Training for primary care physicians			1		1		
Improved access to care	1						1
Better patient education--to know when to seek care		1					1
Continued research to understand the pathogenesis of disease			1				1
Political control of environmental poisons				1			1
Realistic scholarships for medical students		1			1		
National health plan to provide for physician incentive to rural areas and low physician-patient ratio areas	1		1		1		1
More MD's -- i.e. more Med Schools	1		1		1	1	
Clinics and Med facilities in neighborhood			1		1		
Post-grad education for MD's and others				1	1		
Improved physician distribution	4	1			4	1	
Reduction of physician fees and status	1				1		
Med student scholarships for future service		1			1		
Nationally based health insurance	1		1		2		
Initiation of better minority programs at college level		1			1		
Increase and acceptance of paramedical personnel		3			1	2	
Improvements in education, sanitation, nutrition, etc.			1		1		
Increase in numbers of minority physicians				1		1	

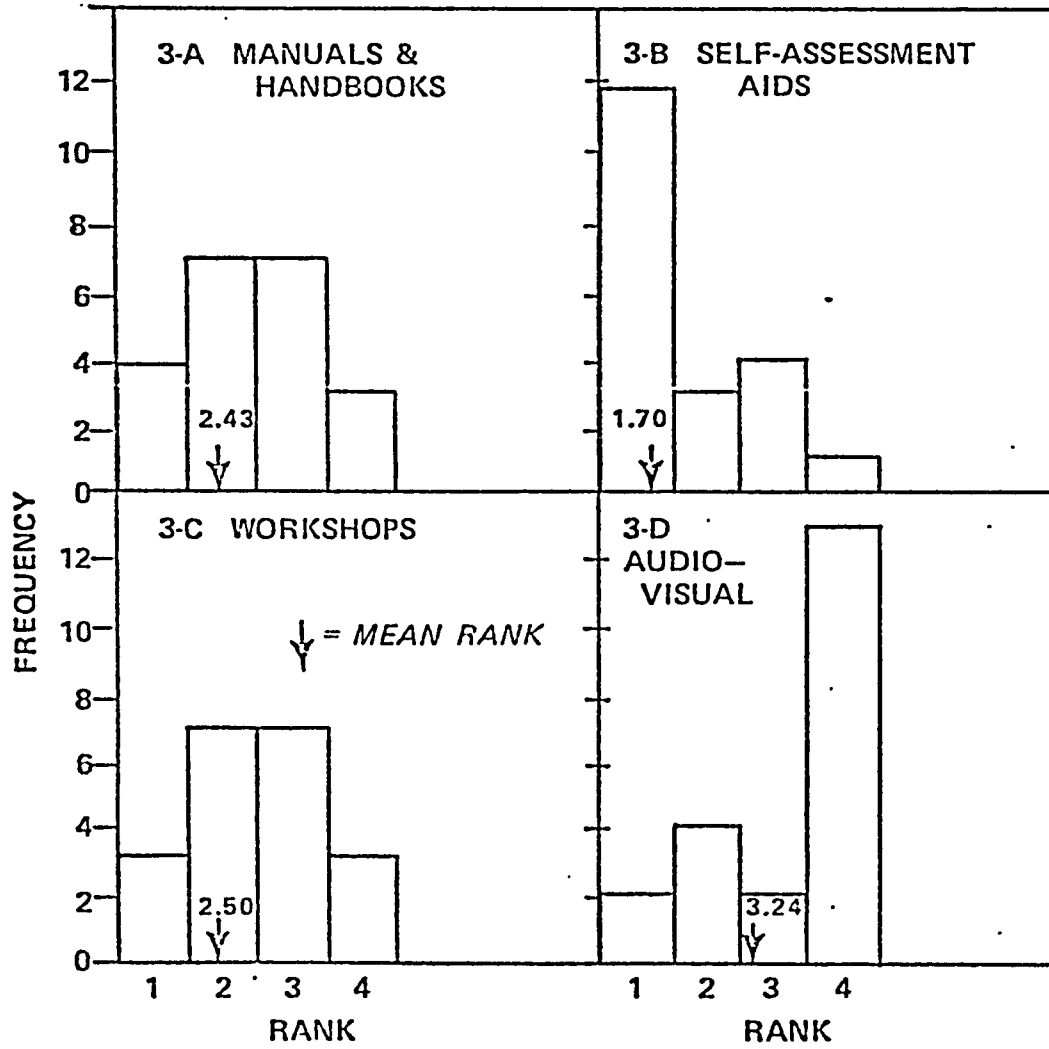
	Rank				Rating		
	1	2	3	4	A	B	NR
Feasibility of group practice in rural areas	1						1
Health maintenance organizations	1						1
More role models of GP's in Medical Schools	1						1
Personal caring and commitment	1				1		
Mutual definition of good health by patient and physician		1			1		
Emphasis on preventive care			1		1		
Increased level of sophistication of consumer			1		1		
Financial support to better communication and transportation				1	1		
Federal increase in medical education funds	1		1	1	2	1	
Increase in the number of students				1		1	
Adequate financing for health care	1				1		
Good blend of students into schools				1	1		
Improved quality of care		1				1	
Improved delivery			1		1		
Revise selection procedures for med students	3				3		
Revise educational experience for med students		2	1		2	1	

B. General Observations

3. Admissions work would benefit from:

	Rank				Rating				
	1	2	3	4	A	B	C	D	NO
a. Manuals and Handbooks	4	7	7	3	6	10	5	0	0
b. Students having self-assessment and career counseling aids	12	3	4	1	11	6	2	0	1
c. Workshops & In-service programs	3	7	7	3	3	8	4	0	3
d. Audio-visual, etc. aids	2	4	2	13	2	10	6	1	2

SECTION B QUESTION 3



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A POSITION PAPER PRESENTING RECOMMENDATIONS FOR
DEVELOPMENT OF AN ADMISSIONS ASSESSMENT PROGRAM
FOR MEDICAL COLLEGES

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PREPARED FOR: Medical College Admissions Assessment Program
Association of American Medical Colleges
Western Regional Conference
Santa Monica, California
July 16-17, 1973



Recommendations

A. The membership of the Western Group on Medical Education strongly support the idea, intent and action, thus far, of the AAMC to develop a comprehensive admissions assessment program. The greater majority of our membership feel that the MCAT should be revised, at the very least, and that the idea of expanding admissions assessment services is long overdue.

B. Cognitive Behavior. The WGME membership felt that the most important area of skills to be assessed in this category are those related to problem solving. This might include abilities associated with analysis, synthesis and logical processes.

It was felt that next in importance should be information about the applicant's potential for successful performance in the clinical sciences. Closely associated with that should be an assessment of both aptitude for and achievement in the following sciences (in ranked order): Physiology, Cell Biology, Chemistry (including Biochemistry) and Biology. Others such as Genetics and Physics were considered to be of secondary importance.

C. Services and Resources. Although it was not discussed at our meetings, I feel confident that the membership of the WGME would support the notion that a compilation of GPA by institution, similar to the one currently provided for MCAT scores, would be a valuable resource for admissions committees.

A most important service which AAMC could provide would be to undertake the task of designing a compendium of uniform materials for the use of all groups involved in the admissions process. This might include many items associated with the interview process such as the interview form itself, materials to help train

interviewers and standardized coding of responses. Such a package could also include standardized formats for pre-med committee recommendations and for individual letters of recommendation. All of this would lend itself to a handbook/manual format for distribution to all concerned individuals and groups. Training in their use could take place during an invitational conference.

Such an undertaking would provide information which could lend itself to studies having potential predictive value in those areas presently considered to be beyond that capability.

D. Non-Cognitive Elements. Our group felt that the ability to communicate effectively and the ability to get along with all kinds of people (perhaps the ability to handle differences) are the two most important dimensions in this category. Accordingly, we strongly recommend the incorporation of standardized measures of such things as sensitivity to self and others, willingness to work cooperatively and the ability to get along with others into the assessment program.

Another area which was mentioned but not discussed involves the sheer workload demanded of both the student and physician. I do not believe that my colleagues would take issue with a recommendation which suggests an assessment of the stamina and willingness, to mention only two parameters, of an applicant for prolonged periods of hard work.

A final recommendation in this category involves the assessment of the interest, willingness, intent, etc. of an applicant to practice where he may be needed. Incorporated in this might be reflected his social concerns. The WGME membership felt strongly that aspect be included in an assessment program.

Conclusion

This has been my attempt to communicate to you the stated position of the WGME. I have purposely refrained from using the following words: Personality, Motivation, Attitude, Behavior, Cultural Bias. Perhaps we can move directly to the operational aspects of developing a Medical College Admissions Assessment Program.



A POSITION PAPER PRESENTING RECOMMENDATIONS FOR
DEVELOPMENT OF AN ADMISSIONS ASSESSMENT PROGRAM
FOR MEDICAL COLLEGES

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July 16-17, 1973



Student support of MCAT revision and expansion of admissions assessment services is variable. Of those students concerned enough to respond to a questionnaire on the subject, the majority favor revision of the MCAT. However, many students object to expansion of admissions assessment services because the cost of such services to the applicants is too great. The question as to whether the MCAT ought to be eliminated or revised should be determined by admissions officers. If they are not going to consider MCAT scores seriously, the exam ought to be eliminated.

I. Recommendations for Development of Measures of Cognitive Behavior

There should be three parts of the MCAT which are oriented toward testing cognitive development.

A. Medical Education Aptitude Test

The goal of this part of the MCAT would be to assess each applicant's aptitude, not achievement, in subject areas which are necessary prerequisites to medical education. These subjects are:

1. Inorganic chemistry
2. Organic chemistry
3. Basic mathematics and algebra
4. Elementary physics
5. Cellular biology
6. Genetics
7. Reading comprehension

In each of the above areas, only basic principles which will be built upon during the medical education should be tested. Questions designed to test reading comprehension should not include vocabulary as a limiting component. This exam should be unified,

not broken down into separate subject areas either in the format of the exam or in the score reported. The exam should be consistent in the weighting of each of these subject areas, not weighting one area more heavily than another, nor varying the weightings from year to year.

B. Special Subject Achievement Test.

The goal of this part of the MCAT would be to assess each applicant's achievement in two specific areas of individual interest. Each applicant would choose two subject areas (from a list of twenty or more) in which he had a special interest. Examples of such subject areas are: classical music, art, psychology, botany, English literature, economics, political science, current events, zoology, sports, American history, chess, anthropology, etc. Scores would be reported directly, rather than as percentile rankings.

C. Problem Solving Ability Test.

The goal of this part of the MCAT would be to assess each applicant's ability to logically analyze and synthesize data in order to solve problems of both a quantitative and non-quantitative nature. The ability to read graphs and charts might be included here. Care would have to be taken to prevent this exam from being culturally biased.

II. Recommendations for Expanded Admissions Assessment Program:

A. Each medical school should prepare an information package for prospective applicants containing:

1. A detailed description of its curriculum, including number of class hours per day, elective time, etc.
2. An honest description of its admissions requirements,

including specific grade point average cut off points, residency requirements, specific grade point average cut off points, residency requirements, course requirements, age limits, reluctance to consider students who have applied to medical schools unsuccessfully in the past, etc.

3. Uncensored descriptions of the medical school and its training program prepared by several medical students at the school.

B. These information packages would be sent to pre-medical advisors, undergraduate libraries, and any pre-medical student requesting them. AMCAS should include reference to these packages with its application forms, strongly suggesting that applicants not apply to any school prior to reading its information materials.

C. The cost of applying to medical school must be reduced by eliminating the secondary application fees charged by schools which participate in AMCAS or by eliminating the initial AMCAS fee. Accompanying a reduction in fees should be the requirement that each applicant list the first five medical schools of his choice (not necessarily in order) on his AMCAS form. His application would be sent only to those five schools, with the understanding that he would be notified within two months if he were considered a certain rejection by any of the schools. After two months time, his application would be sent to the next five schools of his choice for an additional fee, and so on, until medical schools announced that they would receive no more applications.

In order for this to be an effective means of limiting the number of applications to medical schools, the number of schools

participating in AMCAS ought to be increased. Also, AMCAS must improve its efficiency and accuracy in processing applications.

D. In order to make each applicant's score on the Medical Education Aptitude test more meaningful, AMCAS should compute a percentile score based on each applicant's rank among other applicants with the same educational background. i.e., applicants who had not studied organic chemistry prior to taking the exam would be ranked with other applicants who had not studied organic chemistry.

III. Recommendations for Non-Cognitive Elements in an Assessment Program

Biographical information may be included in an expanded AMCAS form, but should not be included in the revised MCAT. OSR also recommends against using the MCAT to elicit information on applicant's attitudes, values, concern for social problems, personality type or motivation. This information, when considered relevant by an admissions committee, is best ascertained through an expanded program of interviews.

OSR recommends only two non-cognitive elements be assessed in an expanded MCAT: judgment and sensitivity to oneself and to others.

A. Assessment of judgment

The MCAT should include situational type questions. Such questions are included in many civil service exams for supervisory personnel and in the Foreign Service Entrance Examination. These questions describe a difficult interpersonal or problematical situation. The applicant is asked how he might handle the situation. He is given four or five possible ways of handling the

situation to choose from, although none of the choices would solve all the problems presented in the situation. The situations included in the exam should be both familiar and unfamiliar to college students and should cover a broad spectrum of cultural settings.

B. Assessment of Sensitivity to Oneself and to Others.

Before the following recommendation is included in a national MCAT, it should be incorporated into a pilot study of entering medical school freshmen to see if students' scores on the exam correlate with later sensitivity expressed during their performance as third and fourth year medical students.

It is recommended that part of the MCAT consist of short films of interviews or dialogues (such as the USC Research and Training Center has made), followed by questions aimed at gauging each applicant's sensitivity to other people's feelings. For example, a question might read:

In the film sequence, Joanne's mood was

- A. Depressed
- B. Mildly hostile
- C. Both hostile and depressed
- D. Contented

These sequences might include interviews of some very ill, suffering or dying patients and perhaps one or two sequences in which a medical student is being put down by a resident in order to expose applicants to a few things they might not have thought about previously, as well as to elicit their reaction to such situations.

IV. Concluding Statement.

Medical students, in general, believe that academic achievement is an important indicator of success in medical school, but

that general success in whatever interest one has pursued is also important. The MCAT should not be used to rank students on the basis of their past training; rather, it should simply distinguish those applicants who are capable of handling a medical school education from those who are not. It should also focus on identifying those applicants who have good judgment and problem-solving ability and who are sensitive to themselves and to others.

It is generally believed that both letters of recommendation from family or friends and attitude or personality testing are invalid. Increased emphasis on interviews and increased numbers of interviews for each applicant are recommended as the best way to evaluate motivation, self-image, effectiveness in human relations, and concern for social issues.

A POSITION PAPER PRESENTING RECOMMENDATIONS FOR
DEVELOPMENT OF AN ADMISSIONS ASSESSMENT PROGRAM
FOR MEDICAL COLLEGES

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PREPARED FOR: Medical College Admissions Assessment Program
Association of American Medical Colleges
Western Regional Conference
Santa Monica, California
July 16-17, 1973



A. Recommendations Regarding Development of a Comprehensive Admissions Assessment Program.

Pre-medical advisors generally believe that the MCAT has served its intended purpose well in assuring a low attrition rate in medical schools. There is much less certainty that it is able to select the best candidates for medical school. In fact, there seems to be a feeling that medical admissions committees may have placed unwarranted confidence in the MCAT test as a general predictor of success. The MCAT scores and GPA records are valuable indicators of academic success, but other important personal qualities are not being adequately identified and evaluated. Pre-medical advisors do not seem to be demanding an overhaul in the evaluation process, but apparently are in general agreement of the appropriateness of such action. Opinions expressed herein are an attempt to state consensus of discussions over the past four years together with a questionnaire distributed at the last regional conference.

B. Recommendations Regarding the Development of Measures of Cognitive Behavior.

Responses of pre-medical advisors indicate no general disapproval of the MCAT test in the areas of cognitive learning. The question of cultural and racial bias sometimes is cited in connection with portions of the test, usually the general knowledge portion.

The advisors overwhelmingly listed science by subject area as the most important academic predictor needed by admissions committees. See tabulation of "Responses from Opinion Survey on MCAT Revision" in the appendix. This was followed by strong

expressions supporting quantitative and verbal skills. Knowledge of a candidate's achievement in the area of logical thought was cited by several. Little concern was expressed regarding achievement in general knowledge, social science and humanities. There seemed to be support for testing by areas of science.

The importance of measuring the various areas of science showed some diversity as perceived by the advisors. Cell Biology received the highest ranking, followed by Chemistry, Biochemistry, Biology, Physiology, Genetics and Physics. A few write-ins were listed for Microbiology, Mathematics, Biophysics, Psychology and Anatomy.

Medical school faculty, both basic science and clinical, seem to be in the best position to determine and evaluate the actual content of the cognitive elements of the assessment program, as it most directly relates to academic success in medical school. A somewhat different position will be taken in the non-cognitive section further in this paper.

It seems that the content of the cognitive section should be designed to predict as reliably as possible, academic achievement in medical school. This would be done without regard for cultural or racial differences, assuming the test can be made truly unbiased for its intended purpose. Allowances for cultural and racial differences can be made on the basis of non-cognitive portion of the assessment program.

C. Recommendations Regarding Services and Resources that will Support an Admissions Assessment Program.

Some procedures and items which would be of help to advisors in student counseling are listed below:

1. Report MCAT test results early and systematically to the advisor. This would aid not only in advising the applicant as he completes his application procedures, but it could aid in alternate career planning. It would also give valuable experience to the advisor in counseling the younger pre-medical students.

2. Publish characteristics of the accepted students and the overall applicant pool, preferably by individual school. This could be made a part of the AAMC annual Admissions Requirements booklet, or it could be done by AMCAS.

3. For better understanding of the nature of the test, its purpose and use, make available to pre-medical advisors the "Handbook for Admissions Committees based on the MCAT," or a portion of it.

4. Publish characteristic descriptions of all medical schools perhaps self-description. This could be included in the AAMC annual Admissions Requirements booklet. There is talk of computer matching of applicants with schools. The school characteristics fed to the computers would be of value to the advisor and applicant.

If some of the descriptive character of each school could be published, applicants and advisors should be better able to intelligently select schools for application and to rank their choices.

5. Develop and publish an advisors' handbook. This might be done in cooperation with AAHP and include advisement information for all health fields.

6. Publish a quarterly bulletin for pre-medical students, such as Columbia's discontinued "Pre-Med."

7. Provide informational films on A-V presentations for

showing annually to pre-medical groups. Probably they should be prepared by AAMC. Suggested subjects: Careers in Medicine, Applying to Medical School, Selecting a Medical School, Financing a Medical Education.

8. Utilize the personal knowledge of the pre-medical advisor. Especially among small and medium size schools, a definite feeling persists among advisors that their personal knowledge of the applicants is not being utilized. It is stated that letters of recommendation sound much alike, and it is likely true. It is suggested here that such letters and personal comments would become much more meaningful and candid if personal acquaintances were developed between admissions officers and advisors. Perhaps due to the heavy applicant load in recent years, admissions officers have seemed inaccessible. It is suggested that sponsoring an annual day of open house, luncheon, or coffee with all available advisors would be a worthwhile step for each school.

9. An open house or other all-day meeting for area pre-medical students such as conducted by USC or UCLA is beneficial to acquaint students with medical school programs.

D. Recommendations Regarding Non-Cognitive Elements in an Assessment Program.

1. It is recognized that the non-cognitive elements are much more difficult to quantify than the cognitive. Nevertheless, an attempt should be made to obtain the best possible assessment of these personal qualities as can be obtained.

2. Certainly motivational factors, compatibility factors, leadership and service factors should be critically evaluated.

3. Important skills necessary in a candidate, according to

the perceptions of the advisors in the survey were, in order of importance: effective human relations, problem solving, communication, analysis and synthesis, with manual dexterity a distant fifth.

4. Most desirable attributes for a candidate as perceived by the advisors were, in order: high sensitivity in interpersonal relations, intensive concern for human needs, willingness to work with others, disposition for scientific pursuits, ability to get along with faculty and students, and predisposition for certain types of practice.

5. Recognize that medicine needs a variety of types of individuals. Especially recognize that some will be practicing physicians with varying degrees of specialization. The above list of attributes were probably cited primarily for practicing physicians. A somewhat different set of attributes might be listed as desirable for the medical researcher.

6. To arrive at non-cognitive assessments, consider the use of questionnaires to the applicant's friends, parents, peers, professional acquaintances, professors and pre-medical advisor, as well as questions for the applicant himself.

7. Give favorable consideration to those likely to serve in needed areas, e.g., rural areas, minority groups. Selection could be partly based on typology, aptitude, or expressed preference. Even a signed agreement or financial incentive could be considered for these areas.

8. Determination and evaluation of the non-cognitive elements in a testing program should include heavy representation from the public sector as well as from the medical schools.

Evaluative personnel should be drawn from practicing physicians, medical administrators, public health officials, minority groups, as well as medical school faculty and contractor personnel.

E. Conclusions.

1. Selections for admission to medical schools should be made to provide an adequate supply of researchers and practicing physicians. The criteria may not be the same for both.

2. Test elements should be designed to eliminate racial or cultural bias. The instrument should test indiscriminately those qualities which will best identify (a) the most capable medical student and (b) the most suitable practicing physician or medical researcher for society's needs. The real objective is to deliver the best possible health care package. Selections to medical schools should be made to best fulfill this goal. Proper evaluation of candidates' suitability to care for society's needs including service and compatibility factors should assure a proper distribution of persons from disadvantaged backgrounds and rural and minority groups.

3. Pre-medical advisors' personal knowledge of applicants should be better utilized. Personal acquaintance should be cultivated and visits encouraged.

4. Numerous informational aids to pre-medical students and advisors could be provided.

5. The resourcefulness of the eager candidate for medical school should not be underestimated. Medical school admissions personnel see themselves as selecting a certain quality student. The student sees himself as presenting the sought-after quality to the admissions committee.

As new criteria for admissions are developed, students will adapt, in some measure, to the expected profile. Many of the successful applicants to medical schools have adopted the following approach, admittedly somewhat exaggerated:

"Into what mold must I cast myself if I am to gain admission to that which I so strongly desire. What are the rules of the game. I am willing to play by any rules. If you want a scientist, I will present myself as a scientist four years hence. If you want a philosopher, I can become one. If you admire leadership, I will secure a number of student offices for myself. I could become an expert chalk carver if that were important. If helping disadvantaged kids looks good, I will do that. I can appear any way you would like for the interview. Just let me know the rules. Once I am in, I will be myself again, though I may not be the same after all of this."

APPENDIX

MEMORANDUM

TO: Dr. Jakway

FROM: P.C. Moore

SUBJECT: Tabulation of returns from "Opinion Survey on
MCAT Revision."

1. A total of 22 questionnaires were received.
2. Column headings:
 - a. Rank numbers are self-explanatory.
 - b. Rating is synonymous with "Response Scale."
 - c. "N.R." equals "No Response."
3. Mean values for "Rank" responses (corrected for additional responses):

<u>Section A</u>		<u>Section B</u>	
Question	Mean	Question	Mean
1a.	3.52	1a.	2.62
b.	2.86	b.	3.57
c.	4.40	c.	2.14
d.	2.95	d.	3.38
e.	2.67	e.	4.19
f.	4.35	f.	5.00
2a.	2.33	3a.	2.48
b.	2.29	b.	1.95
c.	1.38	c.	2.33
d.	1.25	d.	3.20
3a.	3.83		
b.	3.61		
c.	3.94		
d.	2.94		
e.	4.44		
f.	4.89		
g.	4.33		
4a.	2.27		
b.	2.64		
c.	2.18		
d.	2.95		
e.	4.81		

4. Results of tabulations are on following pages and tables.

TABULATION

A. Consideration for an
Admissions Assessment Program

1. Select Candidates for Future Successful Performance (criteria):

	Rank							Rating					
	1	2	3	4	5	6	7	A	B	C	D	NO	NR
a. Medical School Basic Sciences	5	2	2	3	6	2	1	6	9	5	1	1	1
b. Medical School Clinical Sci.	2	6	7	4	1	1	0	10	7	4	0	1	1
c. National Board Medical Exams	1	1	4	3	4	6	1	2	7	6	3	2	2
d. Clinician during Internship	2	7	4	3	3	1	0	10	7	0	1	2	2
e. As Practitioners where...	9	2	2	3	4	1	0	11	8	1	0	2	1
f. As Med. Educ./ researcher	1	3	1	5	2	8	0	5	6	5	2	3	1
g. Capable & resp. Surgeons	1	0	0	0	0	0	0	1	0	0	0	0	21
h. Health planners & administrat	0	0	1	0	0	0	0	1	0	0	0	0	21

2. Admissions committees should know about a candidate's academic achievement (Predictors) in:

	Rank					Rating					
	1	2	3	4	5	A	B	C	D	NO	NR
A. Verbal Skills	4	5	9	3	0	10	9	2	0	1	0
b. Quantitative Skills	0	11	10	0	0	8	11	2	0	1	1
c. Science by subject area	14	4	2	1	0	17	4	0	0	1	1
d. Logical Thought	3	1	0	0	0	4	0	0	0	0	18
e. General Knowledge	0	0	0	1	0	1	0	0	0	0	21
f. Social Science	0	0	0	1	0	0	1	0	0	0	21
g. Humanities	0	0	0	0	1	0	1	0	0	0	21

3. If you agree that science achievement should be measured by certain subject areas, then apply your rating to the areas listed.

	Rank								Rating					
	1	2	3	4	5	6	7	8	A	B	C	D	NO	NR
a. Biochemistry	1	5	1	3	4	3	1	0	9	9	0	1	1	4
b. Chemistry	3	4	1	2	3	3	2	0	7	10	2	0	1	4
c. Biology	3	3	3	1	2	2	1	3	7	9	3	0	1	4
d. Cell Biology	6	2	3	3	1	2	1	0	11	6	2	0	1	4
e. Genetics	0	1	5	5	1	1	3	2	6	9	4	0	1	4
f. Physics	1	2	2	1	2	4	5	1	6	12	1	0	1	4
g. Physiology	3	1	3	1	4	0	5	1	7	7	5	0	1	4
h. Anatomy	0	0	0	0	0	0	0	1	2	0	0	0	0	20
i. Psychology	0	0	0	0	0	1	0	0	0	1	0	0	0	21
j. Microbiology	1	0	0	0	1	0	0	0	2	0	0	0	0	20
k. Mathematics	0	0	0	1	0	2	0	0	1	2	0	0	0	19
l. Biophysics	0	0	0	1	0	0	0	0	1	0	0	0	0	21

4. Admissions assessment programs should also evaluate candidate's skills in:

	Rank					Rating					
	1	2	3	4	5	A	B	C	D	NO	NR
A. Problem solving	7	6	5	4	0	16	5	1	0	0	0
b. Communication	3	6	10	2	1	16	6	0	0	0	0
c. Effective Human relations	8	6	4	4	0	15	7	0	0	0	0
d. Analysis and synthesis	4	5	3	8	2	14	7	1	0	0	0
e. Manual Dexterity	0	0	0	4	17	2	6	8	2	2	2

B. General Observations

1. Candidates I would consider most desirable should possess the following attributes:

	Rank						Rating					
	1	2	3	4	5	6	A	B	C	D	NO	NR
a. Intensive concern for social needs	3	9	4	3	1	1	11	10	1	0	0	0
b. Disposition for Sci. Pursuits	3	2	4	5	5	2	12	4	5	1	0	0

(continued)

(continued)	Rank						Rating					
	1	2	3	4	5	6	A	B	C	D	NO	NR
c. High sensitivity in inter-personal	11	4	2	1	1	2	14	5	2	1	0	0
d. Willingness to work w/ others	1	3	8	5	3	1	11	9	2	0	0	0
e. Ability to get along with faculty/stud'ts	1	2	2	6	6	4	5	11	3	2	1	0
f. Predisposition for certain types of practice	1	1	1	1	5	9	3	6	2	7	3	0
g. Self-knowledge	1	0	0	0	0	0	1	0	0	0	0	21

2. Changes I believe to be essential in improving the quality of health care in this country are:

	Rank				Rating	
	1	2	3	4	A	B
a. A lowering of medical costs	2	1	0	0	3	0
b. Grade school awareness of medicine	1	0	0	0	1	0
c. More medical students	4	0	0	0	4	0
d. More funds	3	3	0	0	6	0
e. Lower educational costs	0	0	1	0	1	0
f. Internship in poverty areas	0	1	1	0	2	0
g. Federal Health Insurance	0	3	1	0	4	0
h. Control of medical specialty for both M.D.'s and students	0	0	0	2	2	0
i. Financial aid for minority students	0	1	0	0	1	0
j. Subsidize medical care in poverty or deprived areas	0	0	1	1	2	0
k. Make health insurance obligatory	0	0	0	1	1	0
l. More Medical Doctors	2	0	1	0	3	0
m. M.D. - area contract/franchise and/or regional redistribution	3	0	0	0	3	0
n. M.D. - patient contract for specific people	0	1	0	0	1	0
o. More Physician's Assistants	0	0	0	1	1	0
p. Eliminate profit motive	2	0	0	0	2	0
q. Make health care more equitably available financially	1	2	1	0	4	0
(continued)						

(continued)	Rank				Rating	
	1	2	3	4	A	B
r. Medical School orientation	1	0	0	0	1	0
s. Subsidize rural area medicine	0	0	1	0	1	0
t. Train M.D.'s in geographically needy areas	0	1	0	0	1	0
u. Stronger internal M.D. practice policy	0	1	0	0	1	0
v. Governmental supervision	0	0	0	1	1	0
w. Reduce ease and ability to sue M.D. for malpractice	0	0	1	0	1	0
x. Federalization of Medical Schools	1	0	0	0	1	0
y. Make M.D. license renewable every 7 years by National Board	0	0	1	0	1	0
z. Increase responsibilities of R.N.'s and P.A.	0	1	1	0	2	0
aa. Emphasize preventive medicine	1	1	0	0	1	1
bb. Tighten food processing regulations	0	1	0	0	1	0
cc. Flood M.D. market and thus force redistribution	0	0	1	0	0	1
dd. More trained health aides	0	0	0	1	0	1
ee. Regional Health planning	0	1	0	0	1	0
ff. More group practices	0	0	0	1	0	1
gg. Health Education	0	0	1	0	0	1
hh. Health Care delivery innovations	0	0	1	0	1	0
ii. Special work incentives	1	1	0	1	3	0
jj. More feeder programs	0	0	0	1	1	0

3. Admissions work would benefit from:

	Rank						Rating			
	1	2	3	4	5	6	A	B	C	D
a. Manuals and Handbooks	5	4	9	2	0	1	9	9	3	1
b. Students having self-assessment and career counseling aids	9	4	6	2	0	0	11	6	5	0
c. Workshops & in-service programs	4	9	3	5	0	0	13	5	4	0
d. Audio-visual, etc. aids	2	3	3	11	1	0	4	10	6	1
e. Feedback from grad M.D.	1	0	0	0	0	0	1	0	0	0
f. Less emphasis on quantitative criteria	0	1	0	0	0	0	1	0	0	0

COMMENTS

In addition to the foregoing responses, one comment was received as a "wirte-in" at the end of the questionnaire.

"This survey assumes a single track namely the practicing physician. More valuable information could well be obtained if the survey made explicit two tracks: practicing physician, and physician-researcher-teacher. If this were done Question B1 could be answered properly. B1 (b) and (c) should not be in conflict. Question A2 might be answered differantly for physicians who were going into research vs. practice. I also feel that to be of maximun value the ranking and rating scales should be considered athogonol (sic)."

(See questionnaire #7)



M C A A P
COMMITTEE ON MEASUREMENT OF
PERSONALITY
OF THE
ASSOCIATION OF AMERICAN MEDICAL
COLLEGES



A POSITION PAPER PRESENTING RECOMMENDATIONS FOR
DEVELOPMENT OF "NON-COGNITIVE" DIMENSIONS FOR AN
ADMISSIONS ASSESSMENT PROGRAM FOR MEDICAL COLLEGES

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Association of American Medical Colleges
Regional Conferences
June - July, 1973



I. Introduction

A. Rationale

Recent years have seen a progressive increase in the number of medical school applicants who are clearly qualified on intellectual-scholastic attributes for admission. The chief concern of admissions committees is no longer that of screening out applicants who are likely to be unable to handle comfortably the academic demands of the medical curriculum. Rather, we are faced with the task of trying to identify among such basically qualified applicants those whose personal traits guarantee that they will function effectively in applying their knowledge to the care of patients.

We must be concerned with the identification of patterns of interests, values, attitudes and temperament which are positively related to the manner in which the student-physician, and later the graduate physician, approaches his patient, establishes and maintains an effective clinical relationship, and by the total impact of his personal qualities assures the optimal application of his medical knowledge and skills. In meeting this challenge, admissions committees face two problems: 1) there is presently a lack of consensus as to what constitutes an optimal mix of non-intellectual (non-cognitive), personality attributes for the physician; and 2) existing instruments and procedures for assessing these characteristics have not been adequately validated against reliable, long-range criteria of physician performance.

This general challenge has associated special demands. To some extent, selection committees are sensitive to the need

for early identification of those students for whom work in primary patient care (family practice) is a more likely congenial career in contrast to those with greater likelihood of satisfying and productive careers in a specialty, in teaching, in research, or in administration. Related to the early identification of such differentials is the desirability of being able to provide early career guidance. Although levels of intellectual aptitude and achievement make some contribution to career variance, it is probable that non-cognitive, personality variables have a larger determining influence.

In light of these considerations, it is timely and propitious that the AAMC undertake a revision of the MCAT in the context of an expanded Medical College Admissions Assessment Program which will include instrumentation and guidance so that medical schools may make a fully rational use of non-scholastic variables in their selection of students.

B. Historical Background

1. The Development of Personality Measures

Modern psychometric practice had its origins in the early 1900's with the modestly successful work of Alfred Binet in developing standard samples of school-related exercises in order to identify early those children likely to be slow learners. In the ensuing 70 years, developments in test theory and statistical methodology have brought the modern "intelligence" test to a high level of efficiency and validity as a predictor of certain criteria, notably academic achievement. While further developments in theory, and in measurement procedures made possible through computer technology, may augment the quality of our

measurements of intelligence, scholastic aptitude tests such as the MCAT appear close to an asymptote for predictive validity.

Measurement of personality dimensions did not assume its present general character until World War I, with the construction of standardized "self-interview" questionnaires which had moderate usefulness in screening out draftees with a likelihood of psychiatric disability under the stress of military service. Over the past half century psychologists have developed significant innovations in the construction of objective personality tests. Important among these have been indices of test-taking attitude which provide for identification of faking or simulation, construction of subtle items, controls for "response sets" (such as acquiescence), use of factor analytic techniques both to study the structure of personality and to create homogeneous measurement scales, and an empirical approach to the development of a multifactor based typology of personality.

Progress in the measurement of non-cognitive (non-intellectual, non-scholastic) traits of the individual has been slowed by the lack of a widely accepted general theory of personality, by difficulties in achieving acceptable and reliable criterion measures against which to validate experimental measures, and by the sheer complexity and fluidity of personality functioning, encompassing as it does such relatively distinguishable behavior classes as attitudes, sentiments, interests, values, and manifestations of temperament and character. In light of these problems it is heartening that the rigorous application of psychological methodology, experimental design and both descriptive and analytic statistics, in empirically anchored studies, have

led to the development of several kinds of instruments with good promise.

It is understood, of course, that we function as wholistically unified, organismically integrated entities with our characterizing behaviors reflecting the dynamic interaction of intellectual, emotive, and appetitive variables. In this sense there are no pure manifestations of cognitive abilities as distinct from non-intellectual qualities. However, we experience and can identify situations which elicit primarily intellectually dominated responses, on the one hand, and those which, on the other hand, are determined more by our wishes and ideals. The problem for psychological research is to construct response-choice situations in which the subject's behavior is minimally influenced by the level of his intellect or the nature of his cognitive abilities. It is such situations, standard in format and sufficiently large in number to provide reliable sampling, that constitute the essence of so-called "personality" tests.

2. The Longitudinal Study

The AAMC has accumulated a rich store of data which allows study of the relationship between a large number of attributes and variables descriptive of the newly matriculated medical school student and his subsequent performance as a student, intern and graduate physician. These are the data of the Longitudinal Study whose subjects were the 1956 freshmen at 28 U.S. medical schools.⁽¹⁾ In addition to basic biographical information, MCAT scores, and pre-medical scholastic achievement indices, scores for these students were obtained on the Strong Vocational Interest Blank (SVIB) and the Edwards Personal

Preferences Inventory (EPPI). These latter measures are good representatives of the non-cognitive domain. Using a variety of criterion measures, including basic sciences performance, peer ratings, early career choice, intern performance, and eventual career selection, it is possible to search out non-intellectual measures, or profiles of such measures, that may provide useful selection inputs as well as basis for early career guidance. Previously completed and prospective analyses of the data from the Longitudinal Study will provide useful guidance to MCAAP personnel in planning for the inclusion of the non-cognitive domain in a new comprehensive assessment program.

3. Committee of the Measurement of Personality (COMP)

The founding of MCAAP represents the culmination of recent concerns and activities of medical school personnel concerned with student selection and of AAMC staff. Particular contributions to this development have come from the G.S.A. and the Division of Educational Measurement and Research of the Association. An early step was the creation by the former MCAT Advisory Committee of a Committee of the Measurement of Personality.*

Organized initially in 1969, COMP was charged to explore the status of the utilization of non-cognitive assessment in medical student selection, to disseminate information, and to encourage collaborative research projects, including extension and further analyses of the Longitudinal Study data. To date, COMP has conducted surveys of medical faculty opinion concerning

*Current membership: Harold Haley, Betty Mawardi, Evan Pattishall, John Williamson, and William Schofield, Chairman; ex officio members: Woodrow Morris, James Erdmann, Davis Johnson, and Ayres D'Costa.

important non-intellectual attributes of physicians, has compiled an annotated bibliography of studies of medical students and physicians with standardized personality tests, (10) has conducted two surveys (1969, 1972) of non-cognitive measures being used by medical schools, has held a Conference on Personality Measurement in Medical Education (1971), (4) has made available a comprehensive clinical rating instrument for the evaluation of student-physicians, and is presently stimulating and coordinating the research of "action teams" that are exploring medical student typology, the use of biographical data, studies of medical school environments, and measures of professional attitudes and measures.

II. General Considerations

A. Current Practices

Use of Standard Tests

In connection with the development of clinical rating scales for use in the Longitudinal Study, a survey of medical school faculties was made in 1957, to collect information as to what variables were considered important in the evaluation of clinical performance. (8) A list of 46 items was obtained which could be classified under three rubrics: personality, intellect, and technical facility. The largest number of items, 20 in all, fell in the personality domain, represented by such items as: effort and initiative, stability under stress, attitude, breadth of interest, diligence, etc.

A more recent survey of the use of standard tests to evaluate non-intellectual, personal characteristics of medical students revealed that 68 different instruments were being used by 117 respondent schools. (2) These included well-established,

published, and highly researched instruments, as well as lesser known "experimental" tests. The four most frequently used instruments, in order, are: Minnesota Multiphasic Personality Inventory, Allport-Vernon-Lindzey Study of Values, Edwards Personal Preference Inventory, and Strong Vocational Interest Blank. Of the 68 devices, 10 were reported in use by 12 or more schools. The range in utilization of standard personality measures per school was from 0 to 10, with an average of three such instruments used per school.

The Interview

It is strongly urged that all persons who are vitally interested in the development of MCAAP, and in particular those who are concerned with the role of the interview in the selection process, carefully review Chapters 4-6, inclusive, of the Report of the Fourth Teaching Institute (1956), "Applicants to Medical Schools."⁽³⁾ As part of a pre-institute survey, it was determined that 62% of participants made no use of objective personality tests while 72% made "much" use of the personal interview! The impact of the critical appraisal of interview validity presented by institute experts, subsequent work in the development of objective measures, and the impressive surveys of "clinical" vs "actuarial" prediction^(5,8) should have significantly altered the order of "commitment" indicated by the above percentages.

As indicated in the recent survey, medical schools have increased considerably their use of standardized instruments to appraise non-intellectual variables. The popularity of the interview, however, appears to persist. Such apparent anachronism

probably reflects at least two factors: the not insignificant public relations aspect of the interview (including the concern for applicant morale), and the understandable albeit unsubstantiated conviction of some admissions officers that they really can use the interview to distinguish the "good" and the "poor" bets.

Apart from the questionable ethics of allowing the individualistic, clinical interview to play a significant determining role in the selection of medical students, there are well-established methods for reducing the error variance of such interviews. These include the enhancement of reliability through the use of multiple interviews (or committee interviews with provision for independent recording of interviewers' appraisals), the use of standard formats for recording interview impressions (preferably rating scales), and statistical averaging. It should be apparent that when the interview is used it should focus on the determination of applicant attributes and traits not readily and more reliably ascertained from other sources. Thus, it is counter-productive to request interviewers to evaluate scholastic ability. On the other hand, for example, the interview permits observation of verbal articulateness and incisiveness of thought, variables which are not readily sampled by paper-and-pencil tests.

Having noted the significant limitations of the interview as part of the applicant assessment process, we must acknowledge at first glance somewhat paradoxically, the critical role of the interview and related clinical observational procedures in providing criteria data for the research studies needed to generate

the instrumentation of a uniform assessment program. The essential paradox is that procedures of lesser reliability and validity can be used to generate criterion measures for the construction of "tests" which then surpass their validating indices. This is the so-called "bootstrap" effect which psychologists have appreciated since the work of Binet.⁽⁶⁾ In order to validate his scales, he required school teachers to identify "bright" and "dull" pupils. But with the full development of reliable psychometric measures of intelligence, we no longer rely on the subjective judgments of teachers to identify students for special classes. It is basically the enhanced reliability of "tests," obtained by consistent and adequate sampling of critical behaviors, that permits them to improve on the "clinical" criteria against which they are originally validated.

B. The Validation Problem

Short-Range Criteria

The ultimate test of the "goodness" of a uniform procedure for assessing medical school applicants, which will take into account demographic, biographical, intellectual and characterological factors, will be the degree to which it enables selection committees to identify individuals whose eventual medical careers, however diverse, are characterized by both effectiveness and satisfaction. But to be a "successful" physician, the individual must first be a "successful" medical student. The role of the physician is by no means a simple extension or expansion of the role of the student; nor are the two roles entirely uncorrelated. It has been found that clinicians do not always "practice" what they "know," but they can-

not practice what they do not know.⁽⁷⁾ Furthermore, with the increasing emphasis on the importance of the physician being a lifetime student, the motivation (dedication, diligence) revealed by the medical student probably will be correlated with his pursuit of post-graduate studies.

It is axiomatic that personality structure is generally stable; the individual manifests predictable continuity rather than disjunctiveness. It is this fact of the consistency of personality over time, coupled with basic logistical considerations, which makes it both necessary and desirable that in the development of MCAAP initial validation studies be made on the medical student.

With respect to the domain of non-cognitive measures, it is in the clinical years and in clinical exercises that we have the best opportunity to make those observations that afford critical validational criteria. It cannot be emphasized too strongly that if such criterion observations are to be both valid and reliable they will require the expenditure of considerable amounts of time and thought by clinical instructors who are dedicated to this task and consistently imbued with the importance of the contribution they are making when they carefully monitor the clinical work of their students. Crucial to their evaluation of students is the opportunity for adequate, repeated, direct observation of the student as he manages his responsibilities to individual patients. For successful development of that sector of MCAAP concerned with non-cognitive variables, it is crucial that medical faculties begin to prepare now for their essential contribution. At least three steps are indicated:

1) identification of those instructors having both the interest and opportunity to provide clinical observations; 2) providing enhanced opportunities for student contact and observation; and 3) developing inservice training programs for clinical instructor-observers.

Long-Range Criteria

Can medical school admission committees eventually have objective methods whereby they may identify the applicant who will ultimately become a primary practitioner? a specialist? a researcher? Will they be able, among equally "qualified" and practice-oriented applicants, to identify those whose subsequent careers are characterized by a high quality of medical care and a high index of "consumer satisfaction?" Will they be able to provide early and meaningful guidance to the senior who is desirous of specializing but undecided as to what kind of career would be optimally satisfying? Will medical college selection procedures ultimately lead to a significant improvement in the distribution and quality of medical care?

In theory, the answer to all of these questions is affirmative. Prediction (selection) will never be perfect, but it is logically and methodologically possible to achieve a closer approximation to explicit medical school goals than has been true in the past. This achievement, entailing as it does the successful pursuit of longitudinal studies and the collection of long-range rather than concurrent or short-range criteria measures, will require time and patience. It is a much more difficult undertaking than the previous goal of reducing or preventing medical school attrition through academic failures or

drop-outs. In the final analysis, the success of the project will rest on the extent to which medical faculties embrace its goals and assign them top priority.

III. Recommendations

The AAMC-COMP group is totally supportive of the development plan for MCAAP. In particular, we favor planning for development of non-cognitive assessment procedures as Phase III rather than earlier in the program. The members of COMP and its associated staff resources stand ready to consult with any persons or groups at any time in the preliminary deliberations directed toward preparation of specifications for a contracted development of research programs.

1. The earliest stages of Phase III should undertake simultaneous, comparative studies of a variety of instruments and approaches by cooperative studies entailing clusters of medical schools with meaningful homogeneity in regard to characteristics of their applicant pools, nature of the medical curricula, size of classes, etc.

2. To the extent feasible, as supported by existing research data, the evaluation of non-cognitive dimensions should utilize existing well-developed, carefully standardized instruments which measure pertinent non-cognitive variables relevant to goals of the selection process.

3. Where there are competing (overlapping), existing instruments without clearly established superiority, there should be carefully controlled, comparative studies.

4. As needed, new instruments with innovative formats should be developed in such a way as to reflect (take advantage of) existing knowledge concerning the pattern of medical

applicant-student interests, values, and attitudes and their established relationships to pertinent criterion variables (e.g. student-physician clinical performance). Stated otherwise, new proprietary instruments should not be constructed if there is evidence that existing measures provide adequate predictive information.

5. Beginning immediately, medical faculties must be intensively recruited for a dedicated effort to provide reliable and comprehensive observations of the functioning of the student-as-physician. Data from such observations will provide the critical short-range criteria required for pilot evaluation of promising measures in the non-cognitive domain.

6. It should be understood by all concerned that if the assessment process is to be meaningfully augmented by the uniform use of instruments covering the non-cognitive domain, the applicant testing program will have to provide adequate total testing time. Those concerned with the development of MCAAP should place primary emphasis on the construction of valid predictors, recognizing that especially in the area of personality dimensions an emphasis on "brief" tests would be detrimental to the goal of reliable and valid measures. It may prove necessary to require as much time for assessment in the non-cognitive area as in the academic ability and science aptitude areas.

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A P P E N D I X



APPENDIX

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List of Participants for Task Force on MCAAP Study

(Indicates participants identified at the time of this printing. Members-at-large yet to be identified will sit with the Task Force).

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AAMC and ACT

Designated AAMC staff and ACT personnel serve in advisory and ex officio capacity for task force.